AD-A116 129 ARMY ENGINEER DISTRICT, ST LOUIS MO F/G 15/7

ENVIRONMENTAL IMPACT STATEMENT OF OPERATION AND MAINTENANCE, LA--ETC (U)

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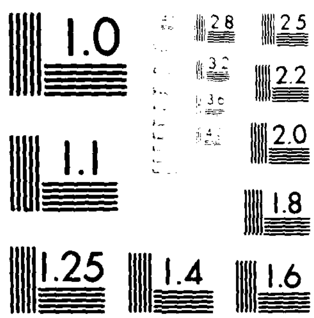
1 OF 4



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NATIONAL BUREAU OF STANDARDS-1963-A

VOLUME I

ENVIRONMENTAL IMPACT STATEMENT OF OPERATION AND MAINTENANCE LAKE SHELBYVILLE, ILLINOIS

1975

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Description of action is continued operation and maintenance of Lake Shelbyville in Shelby and Moultrie Counties, Illinois. Project purposes include flood control, water supply, navigation, recreation and fish and wildlife conservation.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

FINAL

ENVIRONMENTAL STATEMENT

LAKE SHELBYVILLE
ILLINOIS

Prepared by

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
ST. LOUIS, MISSOURI

1975

LAKE SHELBYVILLE, ILLINOIS

SUMMARY SHEET

( ) Draft   (X) Final Environmental Statement

Responsible Office: U. S. Army Engineer District, St. Louis, phone no. 268-2831

1. Name of Action: (X) Administrative ( ) Legislative

2. Description of Action: Continued operation and maintenance of Lake Shelbyville in Shelby and Moultrie Counties, Illinois. Project purposes include flood control, water supply, navigation, recreation, and fish and wildlife conservation.

3. Environmental Impacts and Effects:

a. Environmental impacts - Provides low flow augmentation and downstream protection from major floods. Stored water provides a potential source for municipal use and downstream navigation. Fluctuating water levels result in some unstable banks and sometimes interfere with recreational use. Maximum controlled discharges cause minor flooding of longer duration downstream than would natural flows. Recreational facilities can serve over three million visitors annually. Fish stocking programs and wildlife management techniques enhance fishing and hunting opportunities. Some enhancement of local economies results from operation of the lake for recreation.

b. Adverse environmental effects - The fluctuating water level damages both aquatic and terrestrial communities, kills shoreline trees, aggravates erosion, and interferes with recreational use during some summers. Frequent small floods caused by discharges interfere with farming and downstream ecosystems. Some natural areas are damaged by recreational development and use. Requirements for community services and road improvements strain local budgets.

4. Alternatives: Remove the dam and abandon the project. Maximize flood control benefits. Limit maximum discharges to seasons when agriculture would not be affected. Reduce or eliminate pool fluctuations. Establish a commercial fishery. Either intensify or decrease operations for fish and wildlife, and for recreation. Improve tourist facilities.

5. Draft Environmental Statements were sent to the following for review and comment: (An asterisk indicates that a response was received.)

Federal agencies

U. S. Soil Conservation Service, Sullivan, Illinois
* U. S. Department of the Interior, Office of Environmental Project Review, Washington, D. C.

* U. S. Forest Service, Eastern Region, Milwaukee, Wisconsin
* U. S. Soil Conservation Service, State Conservationist, Champaign, Illinois
* OEO, Chicago Regional Office, Chicago, Illinois
Regional Federal Highway Administrator, Homewood, Illinois
Office of Economic Opportunity, Washington, D. C.
* U. S. Department of Transportation, U. S. Coast Guard, Washington, D. C.
U. S. Department of Commerce, Washington, D. C.
* U. S. Environmental Protection Agency, Regional Administrator, Chicago, Illinois
* Advisory Council on Historic Preservation, Washington, D. C.
U. S. Soil Conservation Service, Shelbyville, Illinois

State agencies

Illinois Department of Conservation, Havana, Illinois
Mr. Bill Fritz, Illinois Department of Conservation, Carlyle, Illinois
Illinois Department of Conservation, Findlay, Illinois
Illinois Department of Natural History Survey Laboratory, Sullivan, Illinois
* Illinois Department of Conservation, Springfield, Illinois
Illinois Department of Conservation, Charleston, Illinois
Illinois Department of Business and Economic Development, Springfield, Illinois
* Illinois Archeological Survey, University of Illinois, Urbana, Illinois
Illinois Environmental Protection Agency, Springfield, Illinois
* Illinois Natural History Survey, Urbana, Illinois
* Mr. Anthony Dean, State Historic Preservation Officer for Illinois, Springfield, Illinois

Local Government agencies

Shelby County Board of Supervisors, Shelbyville, Illinois
* Moultrie County Board of Supervisors, Sullivan, Ilinois
Shelby County Zoning Administrator, Shelbyville, Illinois
Moultrie County Planner, Sullivan, Illinois

Citizen groups

Kaskaskia River Association, Shelbyville, Illinois
* Shelbyville Chamber of Commerce, Shelbyville, Illinois
Environmental Response, Washington University, St. Louis, Missouri
Coalition for the Environment, St. Louis Region, St. Louis, Missouri
* Migratory Waterfowl Hunters, Inc., Godfrey, Illinois
The Wildlife Society, Illinois Chapter, Springfield, Illinois
Illinois Wildlife Federation, Blue Island, Illinois
The Coalition on American Rivers, Champaign, Illinois
Illinois Audubon Society, Galesburg, Illinois
The Nature Conservancy, Illinois Chapter, Chicago, Illinois
American Fishing Society, Illinois Chapter, Chicago, Illinois.

6. Draft Statement to CEQ 7 June 1974.

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PART I

PROJECT DESCRIPTION

PROJECT DESCRIPTION

Location and Setting

The Kaskaskia River originates in east central Illinois near the cities of Champaign-Urbana and flows southwesterly for 325 miles, joining the Mississippi River near Chester, Illinois. (See Plate I-1.) Shelbyville dam is at river mile 222 (upstream from the confluence with the Mississippi River) and forms Lake Shelbyville which is the uppermost of two major impoundments on the Kaskaskia River. Carlyle Lake is formed by Carlyle dam at river mile 107.

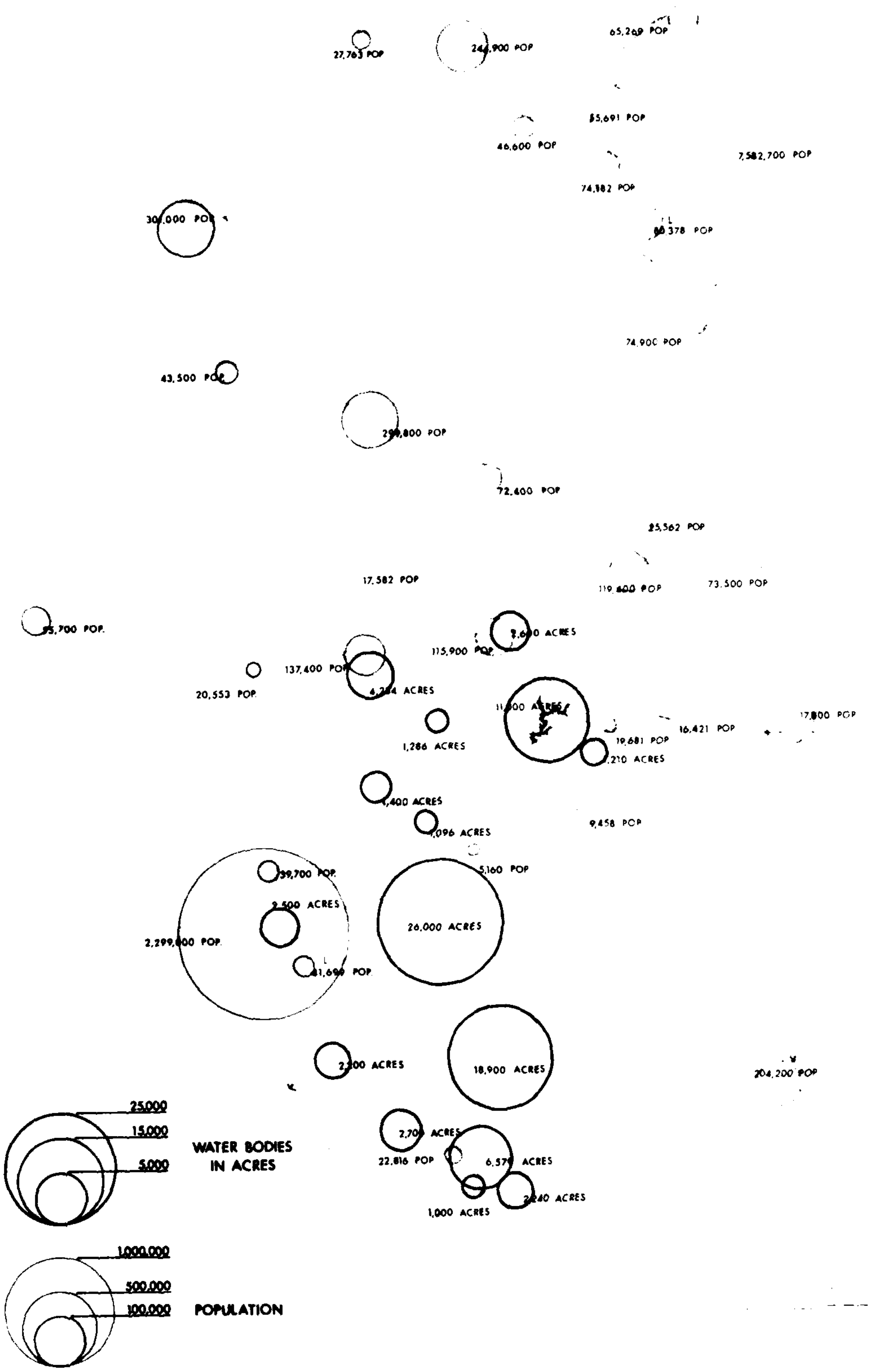
Shelbyville dam is located at the edge of the Shelbyville moraine which marks the most southerly position of the most recent continental glacier. Where the river cuts through the moraine, valleys are deep, narrow and steep sided, while the uplands are flat and poorly drained. The location of Lake Shelbyville at the moraine accounts for the fact that Shelbyville is a fairly deep lake in a region where topographic relief is generally small.

The uplands surrounding the lake are used primarily for agriculture, but originally they were prairie. Valley slopes remain wooded because they are too steep to cultivate. The majority of the 172 mile shoreline of Lake Shelbyville is wooded and the 11,100 acre lake (at normal pool elevation) extends into numerous narrow wooded tributary valleys.

Lake Shelbyville is in Shelby and Mountrie Counties of Illinois. The region is rural, with 86 percent of the land use in the Upper Kaskaskia River Basin devoted to agriculture. The urban center closest to Lake Shelbyville is Decatur, 31 miles to the north, which is accessible by State Highways 121 and 128. Other cities within 100 miles of Lake Shelbyville include Springfield, the State Capitol to the northwest, accessible by State Highways 16 and 29; Vandalia to the south; Centralia to the southeast; Terre Haute, Indiana to the east; and Champaign-Urbana to the northeast. The metropolitan centers of St. Louis and Chicago lie 100 miles to the southwest and 180 miles to the northeast respectively. (See Plate I-1.) Interstate Highway 70 crosses the State in an east-west direction about 30 miles south of Lake Shelbyville. Interstate 57 crosses the state in a north-south direction about 20 miles to the east of Lake Shelbyville. These highways provide relatively good access to the lake from the cities of Chicago, Champaign-Urbana, and St. Louis.

Authorization and History of the Project

Lake Shelbyville was authorized by the Flood Control Act of July 3, 1958. The authorized purposes of the Lake Shelbyville project are flood control on the Kaskaskia and Mississippi Rivers, domestic and industrial water supply, navigation releases for the Kaskaskia River, fish and wildlife conservation, and recreation. Low flow releases are made for downstream water quality control.



GEOGRAPHIC LOCATION

PLATE I-1

Flood Control

The original authorizing document for Lake Shelbyville on the Kaskaskia River (Public Law 85-500, 85th Congress, S3910) provided for a dam and impoundment at Shelbyville and six levee districts between Cowden and Vandalia.

The Kaskaskia River at Shelbyville had a history of major floods resulting in a peak discharge in excess of 15,000 c.f.s. (cubic feet per second). These floods occurred as a result of storms in May, 1908; August, 1915; May, 1943; April, 1944; December, 1949; March, 1950; February, 1951; June-July, 1957; and February, 1959. The operation of Lake Shelbyville, together with Carlyle Lake, was authorized to afford protection for approximately 69,000 acres of fertile bottomlands.

To date, the Kaskaskia River Basin flood control projects have been completed to the extent that dams have been built at Shelbyville and Carlyle, and the Village of New Athens has been afforded flood protection. Levee construction between Cowden and Vandalia has been delayed for lack of local support.

Water Supply

Twenty-five thousand acre feet of the joint use water storage requirement of 180,000 acre feet is allocated to water supply storage as authorized by the Flood Control Act of 1938. The storage is sufficient to permit a mean daily withdrawal of 17.1 c.f.s. for a two year period. The allocation for water supply use is for the contiguous area and municipalities, and the cost of storage allocated for water supply in Lake Shelbyville is to be reimbursed by the users. The State of Illinois is contributing the costs of allocated water supply storage. At the present time, there are no immediate plans to utilize the water storage either for domestic or industrial purposes.

Navigation

Lake Shelbyville, along with Carlyle Lake, is designed to supply water for the Kaskaskia River Navigation Project at a volume of 155,000 acre feet. (An acre foot is a volume of one acre in the horizontal dimension by one foot deep - or about 322,000 gallons.) The River and Harbor Act of 23 October, 1962, authorized the construction of a canal, dam, an 84-foot by 600 foot lock, and alterations to highway and railroad bridges on the Kaskaskia River to provide a nine-foot navigation channel, 225 feet wide, from the mouth to Fayetteville, Illinois. The purpose of the project is to provide for navigable depths for the downstream movement of coal from mines along the Kaskaskia River. The canal, lock and dam, and highway and railroad alterations are under construction.

Fish and Wildlife Conservation

Resource development activities pertaining to fish and wildlife conservation were authorized under the Fish and Wildlife Coordination Acts of

1946* and 1959**. Approximately 6,231 acres have been outgranted to the State of Illinois, Department of Conservation, for wildlife management in accordance with the general policy of these laws. Wildlife management areas are designed to enhance the hunting potentials for upland game species such as squirrels, cottontails, bobwhite quail and waterfowl. A Wildlife Management Program*** for lands not outgranted to the Department of Conservation has been developed, the objective of which is to produce the maximum number of wildlife species for the use and enjoyment of the public, consistent with the joint objectives of the lake project.

Recreation

Development and management of recreation facilities at Lake Shelbyville were authorized under the Flood Control Act of 1944****, the River and Harbor Act of 1945*****, and the Flood Control Act of 1962******. Recreation facilities have been developed on about 1,000 acres.

The authorizing laws permit leasing of property to concessionaires to provide such services as boat storage, boat sales and services, guide services and restaurants. There are three commercial marina concessions operating on the lake with leases covering a total of 134 acres of fee-owned land. The Illinois Department of Conservation operates two State Parks, totalling 4,140 acres which include recreation facilities.

Physical Data

Pool Levels

Lake Shelbyville has a surface area of 11,100 acres at the normal pool elevation of 599.7 feet above mean sea level. Regulated pool elevations may be either higher or lower than normal pool.

Joint-Use Pool. Normal pool elevation is the top of the "joint-use" pool. At normal pool, the lake has 172 miles of shoreline and a total storage capacity of 210,000 acre feet.

Inactive Pool. During severe drouths, the pool may approach elevation 573.0 feet which is the top of the inactive pool. This pool has a surface area of 3,000 acres and a total storage capacity of 30,000 acre feet. (See Table I-1.) Part, or eventually all, of the inactive pool may be used for sediment storage.

Flood Control Pool. Above joint-use pool, the flood control pool adds another 474,000 acre feet of storage to the lake when the water level is at elevation 626.5. (See Table I-1.) The lake has a surface area of 25,300 acres, and 376 miles of shoreline when water is at the top of the

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*Public Law 732, 79th Congress (48 Stat. 401).
**Public Law 624, 85th Congress (72 Stat. 563).
***In compliance with Public Law 85-624, ER 1120-2-400 and ER 1130-2-400.
****Public Law 534, 78th Congress.
*****Public Law 14, 79th Congress.
******Approved 23 October, 1962 (Public Law 87-874, 87th Congress, 76 Stat. 1195).

Table I-1

POOL ELEVATIONS AND CAPACITIES

Inactive Pool		
Elevation	Feet	573.0
Area at top of pool	Acres	3,000
Storage	Acre-Feet	30,000
Joint-Use Pool		
Elevation	Feet	573.0-599.7
Area at top of pool	Acres	11,100
Storage	Acre-Feet	180,000
Flood Control Pool		
Elevation	Feet	599.7-626.5
Area to top of pool	Acres	25,300
Storage	Acre-Feet	474,000
Total Lake Storage at Top of Flood Control Pool - Elevation 626.5	Acre-Feet	684,000
Induced Surcharge Pool		
Elevation	Feet	626.5-630.5
Area at top of pool	Acres	28,300
Storage	Acre-Feet	107,100
Surcharge Pool (Total)		
Elevation	Feet	626.5-638.2
Area at top of pool	Acres	35,800
Storage	Acre-Feet	351,900
Freeboard		
Elevation	Feet	638.2-643.0
Area at top of dam	Acres	42,700
Storage	Acre-Feet	191,100

flood control pool. Above the flood control pool, there is an induced surcharge pool and a surcharge pool for emergency flood situations.

Land Use

Lake Shelbyville is included in a 34,408 acre fee-owned area. Flowage easements are owned on another 6,098 acres. All land surrounding the lake is either owned or in easement to an elevation of 630.5 feet. Of the fee-owned land, about 32 percent is normally water surface, 15 percent forested, nine percent open land, eight percent intensively developed recreation and administration areas, and 35 percent leased to the State of Illinois.

Description of the Lake

The lake is shaped like a large "Y", with the Kaskaskia River forming the eastern upper branch and the West Okaw River, a major tirbutary to the Kaskaskia, forming the western upper branch. The two Fish and Wildlife Management Areas, totaling 6,231 acres, are located at the upper ends of fee-owned land on the West Okaw and Kaskaskia Rivers. Moving south from the junction of the West Okaw and Kaskaskia branches of the lake, there are several smaller branches formed by Wolf Creek, Sand Creek, Coon Creek, Opossum Creek, and Lithia Springs Creek. This lower portion of the lake is surrounded by many heavily wooded slopes and most of the recreational development is in this area. (See Plate I-2.) The State Parks include land on both sides of the lake just below the junction of the two main branches.

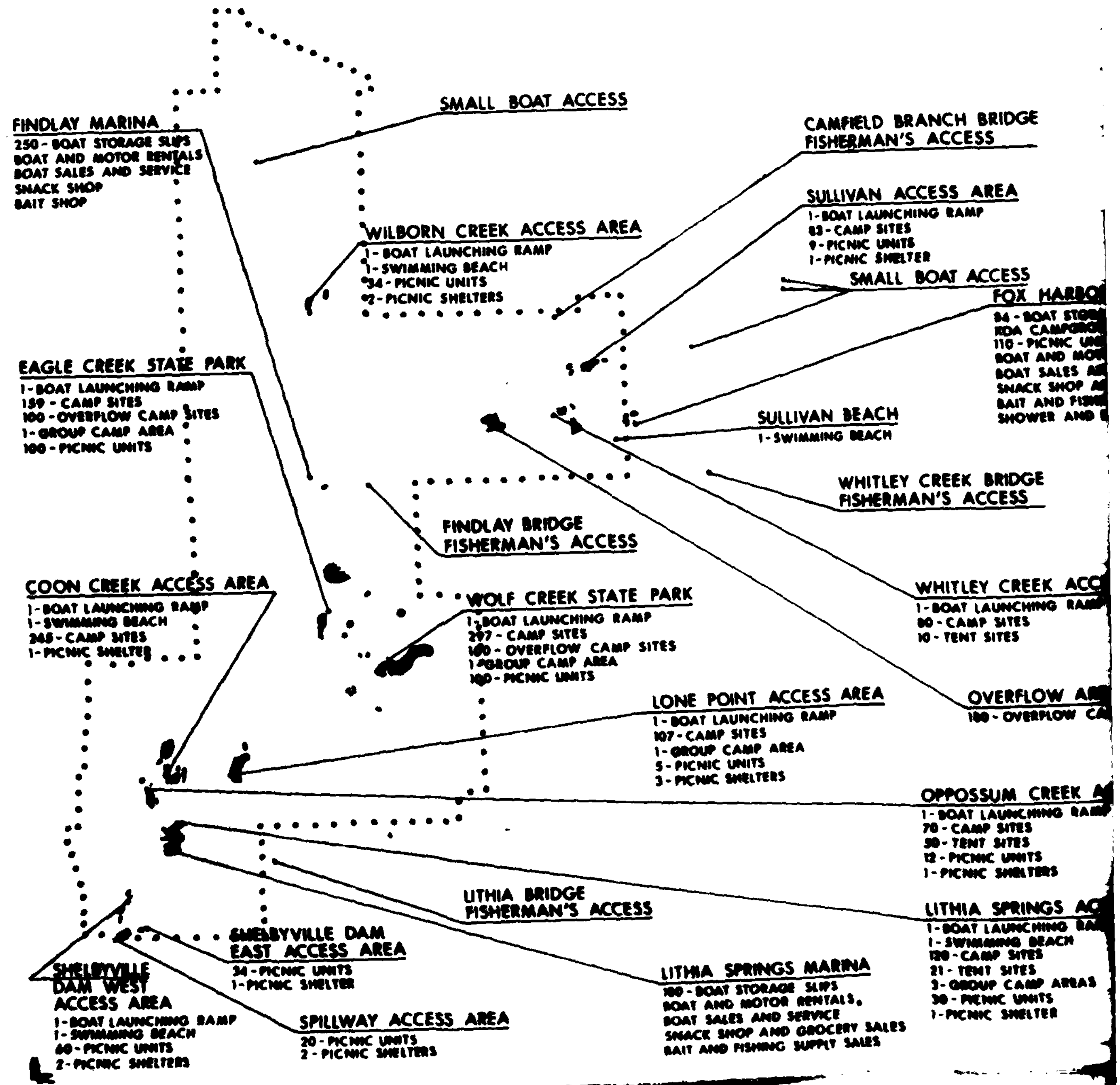
Major Structural Features of the Project

Dam

Lake Shelbyville dam is a compacted earth structure with a concrete chute-type spillway section surmounted by three tainter gates and a gravity outlet structure extending through the main concrete section. The structure, including the spillway section, is 3,392 feet long and rises 108 feet above the original stream channel. A public access road is provided on top of the dam at elevation 643.0.

Spillway and Outlet Works

The spillway is a gravity type concrete structure equipped with three tainter gates measuring 36.92 feet by 45.33 feet. The spillway crest is located at elevation 593. The spillway provides a capacity of 103,000 cubic feet per second at elevation 626.5 (top of flood control pool) and a capacity of 157,500 c.f.s. at elevation 638.2 (top of surcharge pool). The top of the tainter gates in the closed position is at elevation 627.5, which is one foot above the top of the flood control pool. The gates are controlled by electrically operated hoisting machinery located in the piers and abutments of the dam. Releases over the spillway discharge into a concrete stilling basin by way of a concrete chute, both of which are placed



SMALL BOAT ACCESS
FINDLAY MARINA
250 - BOAT STORAGE SLIPS
BOAT AND MOTOR RENTALS
BOAT SALES AND SERVICE
SNACK SHOP
BAIT SHOP
CAMFIELD BRANCH BRIDGE FISHERMAN'S ACCESS
SULLIVAN ACCESS AREA
1 - BOAT LAUNCHING RAMP
83 - CAMP SITES
9 - PICNIC UNITS
1 - PICNIC SHELTER
WILBORN CREEK ACCESS AREA
1 - BOAT LAUNCHING RAMP
1 - SWIMMING BEACH
34 - PICNIC UNITS
2 - PICNIC SHELTERS
SMALL BOAT ACCESS
EAGLE CREEK STATE PARK
1 - BOAT LAUNCHING RAMP
159 - CAMP SITES
100 - OVERFLOW CAMP SITES
1 - GROUP CAMP AREA
100 - PICNIC UNITS
SULLIVAN BEACH
1 - SWIMMING BEACH
WHITLEY CREEK BRIDGE FISHERMAN'S ACCESS
FINDLAY BRIDGE FISHERMAN'S ACCESS
COON CREEK ACCESS AREA
1 - BOAT LAUNCHING RAMP
1 - SWIMMING BEACH
245 - CAMP SITES
1 - PICNIC SHELTER
WOLF CREEK STATE PARK
1 - BOAT LAUNCHING RAMP
297 - CAMP SITES
100 - OVERFLOW CAMP SITES
1 - GROUP CAMP AREA
100 - PICNIC UNITS
80 - CAMP SITES
10 - TENT SITES
LONE POINT ACCESS AREA
1 - BOAT LAUNCHING RAMP
107 - CAMP SITES
1 - GROUP CAMP AREA
5 - PICNIC UNITS
3 - PICNIC SHELTERS
70 - CAMP SITES
30 - TENT SITES
12 - PICNIC UNITS
1 - PICNIC SHELTERS
LITHIA BRIDGE FISHERMAN'S ACCESS
SHELBYVILLE DAM EAST ACCESS AREA
34 - PICNIC UNITS
1 - PICNIC SHELTER
SHELBYVILLE DAM WEST ACCESS AREA
1 - BOAT LAUNCHING RAMP
1 - SWIMMING BEACH
60 - PICNIC UNITS
2 - PICNIC SHELTERS
SPILLWAY ACCESS AREA
20 - PICNIC UNITS
2 - PICNIC SHELTERS
LITHIA SPRINGS MARINA
100 - BOAT STORAGE SLIPS
BOAT AND MOTOR RENTALS,
BOAT SALES AND SERVICE
SNACK SHOP AND GROCERY SALES
BAIT AND FISHING SUPPLY SALES
1 - SWIMMING BEACH
120 - CAMP SITES
21 - TENT SITES
3 - GROUP CAMP AREAS
30 - PICNIC UNITS
1 - PICNIC SHELTER

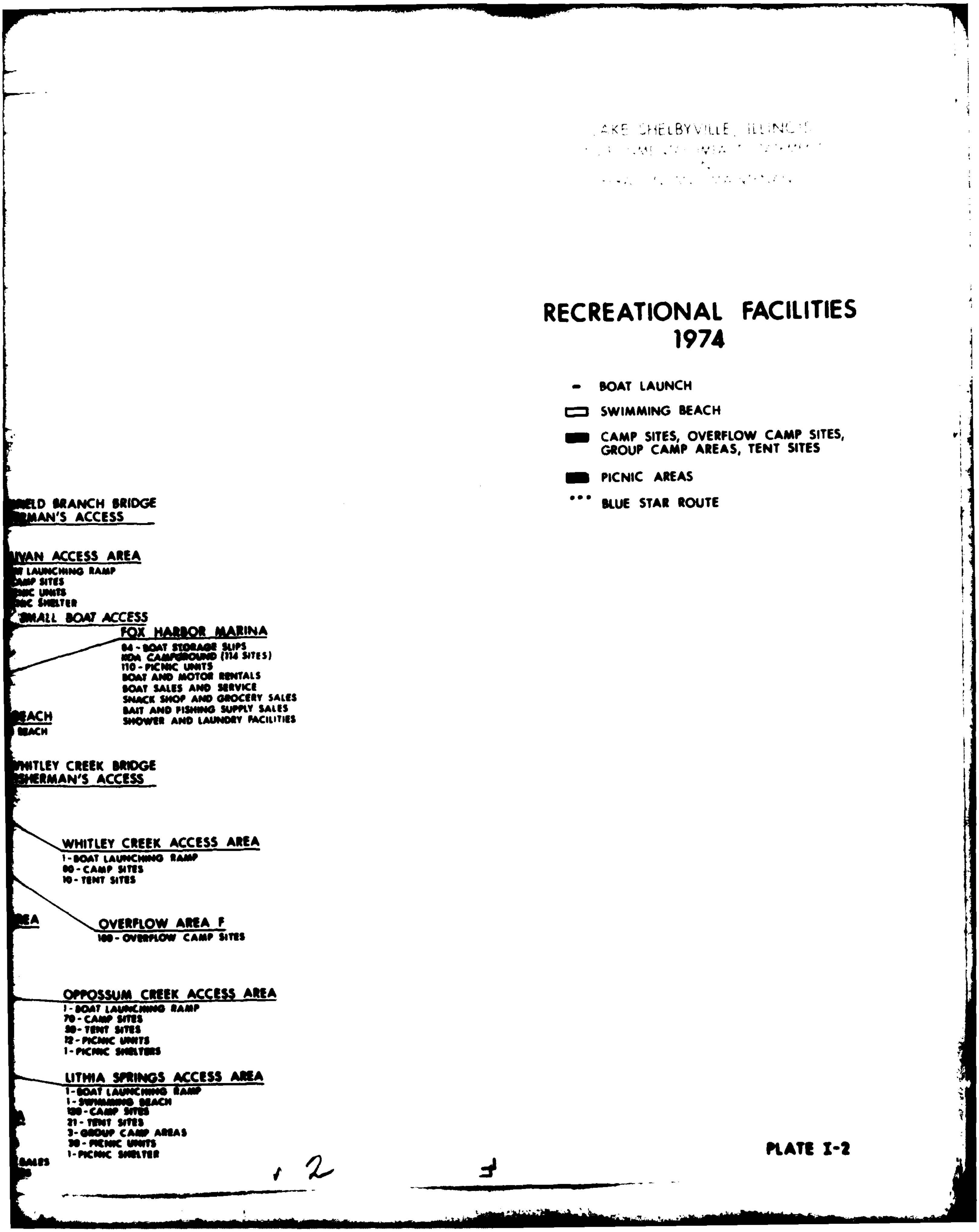

LAKE SHELBYVILLE, ILLINOIS
RECREATIONAL FACILITIES
1974
BOAT LAUNCH
SWIMMING BEACH
CAMP SITES, OVERFLOW CAMP SITES, GROUP CAMP AREAS, TENT SITES
PICNIC AREAS
BLUE STAR ROUTE
ELD BRANCH BRIDGE
MAN'S ACCESS
IVAN ACCESS AREA
LAUNCHING RAMP
AMP SITES
NIC UNITS
NIC SHELTER
SMALL BOAT ACCESS
FOX HARBOR MARINA
84 - BOAT STORAGE SLIPS
KOA CAMPGROUND (114 SITES)
110 - PICNIC UNITS
BOAT AND MOTOR RENTALS
BOAT SALES AND SERVICE
SNACK SHOP AND GROCERY SALES
BAIT AND FISHING SUPPLY SALES
SHOWER AND LAUNDRY FACILITIES
EACH
BEACH
WHITLEY CREEK BRIDGE
SHERMAN'S ACCESS
WHITLEY CREEK ACCESS AREA
1 - BOAT LAUNCHING RAMP
80 - CAMP SITES
10 - TENT SITES
EA
OVERFLOW AREA F
100 - OVERFLOW CAMP SITES
OPPOSSUM CREEK ACCESS AREA
1 - BOAT LAUNCHING RAMP
70 - CAMP SITES
30 - TENT SITES
12 - PICNIC UNITS
1 - PICNIC SHELTERS
LITHIA SPRINGS ACCESS AREA
1 - BOAT LAUNCHING RAMP
1 - SWIMMING BEACH
130 - CAMP SITES
21 - TENT SITES
3 - GROUP CAMP AREAS
30 - PICNIC UNITS
1 - PICNIC SHELTER
SALES

PLATE I-2

2

on a rock foundation. The stilling basin is located at elevation 513 and is 156 feet wide by 125 feet long. The chute is 156 feet wide and 205.69 feet long.

Two, five feet-six inch by 11 feet outlet sluices with outlet invert at elevation 549 feet are provided through the main concrete section of the dam for normal operations of the lake. The two gate-operated sluices provide a release capacity of 3,000 c.f.s. or greater at pool elevations of 573.0 and above.

Secondary Structural Features

Structural improvements related to the Lake Shelbyville project include bridges and roadways, and facilities for recreation, administration and maintenance. State and private concessionaires have provided additional recreation facilities.

Bridges and Roads

Two bridges and approximately 6,800 feet of track and embankment were built for the Illinois Central Gulf Railroad where the tracks now cross the West Okaw and Kaskaskia Rivers at the northern ends of fee-owned property. Highway bridges were constructed southeast of Bethany, parallel to the railroad bridge and east of Sullivan just upstream from the railroad bridge. Both of the bridges serve State Route 121. Another railroad bridge crosses the lower end of the West Okaw branch of the lake, and serves the Chicago and Eastern Illinois Railroad. The Findlay Highway Bridge, due east of Findlay on State Route 642, is 3,174 feet long and crosses the lake just above the State Parks. Coal Shaft Bridge crosses the lower end of the Kaskaskia River arm of the lake southwest of Sullivan. The State Route 32 bridge is due south of Sullivan crossing the middle of the Kaskaskia River arm of the lake.

Recreation Facilities

Most recreation facilities are located along the shore of the lower fourth of the lake. These include the Lone Point, Coon Creek, Opossum Creek and Lithia Springs access areas, the Shelbyville Dam west and east access areas, and the Spillway access area below the dam. The Wilborn Creek access area is on the West Okaw arm of the lake and the Sullivan and Whitley Creek access areas are on the Kaskaskia arm. The State Parks include their own access areas just to the south of Findlay Bridge. (See Plate I-2.)

Access areas generally include boat launching ramps, picnic areas, campgrounds, and sanitary facilities. Most of the comfort stations provide running water, and several have showers and laundry facilities. Coon Creek and Sullivan access areas have 128 and 83 trailer sites, respectively, with electrical hook-ups. A few access areas have beaches. (See Table I-2.)

Table I-2

EXISTING RECREATIONAL DEVELOPMENT[1]

Recreation Facility	Opossum Creek	Coon Creek	Lone Point	Wilborn	Sullivan	Whitley Creek	Lithia Springs	East Access	Spillway	West Access	Area F	Sullivan Beach (Supplement 8)	CORPS TOTAL	Eagle Creek State Park	Wolf Creek State Park	ILLINOIS TOTAL	GRAND TOTAL
Camp Sites	70	245	107		83	80	120						705	159	297	456	1,161
Tent Sites	50					10	21						81				81
Overflow Camp Sites											180		180	100	100	200	380
Group Camp Areas			1				3						4	1	1	2	6
Picnic Units	12		5	34	9		30	34	20	60			204	100	100	200	404
Picnic Shelters	1	1	3	2	1		1	1	2	2			14				14
Comfort Stations (Vault)	3	1					5				9		18	20	30	50	68
Comfort Stations (Waterborne)	5	14	6	4	4	4	7	3	2	2			51				51
Fountains and/or Hydrants	12	24	10	5	10	7	20	5	7	5	8		113	22	34	56	169
Boat Ramps	1	1	1	1	1	1	1			1			8	1	1	2	10
Launch Lanes	4	2	2	2	2	2	2			4			20	4	4	8	28
Beaches		1		1			1			1		1	5				5
Nature Trail		1											1				1
Laundry		1			1	1	1						4				4
Showers	1	1	1		1	1	1			1			7				7
Electric Outlets		128			83								211		297	297	508
Trailer Dump Stations	1	1	1		1	1	1						6	1	1	2	8
Fish Cleaning Station	1	1	1	1	1	1	1						7				7

[1]Inventory includes facilities proposed in Supplement No. 9, approved 9 November 1973.

Administrative and Maintenance Facilities

In addition to recreation facilities, an administration building, a maintenance building and various other structures have been built. (See Table I-3.)

Table I-3

ADMINISTRATION AND MAINTENANCE FACILITIES

Structure	Floor Space
Administration Building (1)	3,318 sq. ft.
Family Housing (2)	5,880 sq. ft.
Maintenance Building (1)	4,800 sq. ft.
Storage Area (covered)	11,420 sq. ft.
Storage Area (uncovered)	121,300 sq. ft.
Oil and Gas House (1)	72 sq. ft.
Miscellaneous Buildings	800 sq. ft.
Sewage Treatment Plants and Operator's Buildings (8)	11,360 sq. ft.
Antenna Towers (5)	

Relocated Facilities

The lake construction necessitated some relocation of utilities. These include: 56.2 miles of power lines, 45.5 miles of telephone lines, and 17,000 lineal feet of gas and oil pipelines. One cemetery was also relocated.

State Park Recreation Facilities

The State of Illinois has constructed and operates two State Parks. Wolf Creek State Park is to the east and Eagle Creek State Park is to the west of Lake Shelbyville. They include picnic areas, boat launching ramps and camping area with vault-type toilets, water fountains and some electrical hook-ups.

Private Recreation Facilities

There are three commercial marina concessionaires at Lake Shelbyville. Findlay Marina, at the west end of the Findlay Bridge, has a snack shop, boat and motor rentals, sales, service and storage facilities, and bait stand. Fox Harbor Marina, just south of Sullivan, has a snack shop and grocery shop, bait stand and fishing supply outlet, boat and motor rentals and facilities for boat sales, service and storage. Another part of this complex includes a KOA campground facility with shower and laundry facilities. The Lithia Springs Marina, about two miles north of the dam, has a snack and grocery shop, bait stand, boat and motor rentals and boat sales, service and storage facilities.

New or Continuing Construction

New or continuing construction within the project area is scheduled for four of the existing public access areas. The additional construction is primarily directed toward improving and expanding camping facilities.

Opossum Creek Access Area

The multi-use area provides camping, boat launch ramp and picnicking. New construction in the southern portion of the existing camping area is to provide a washhouse, two waterborne type comfort stations and a sewage lift station needed to connect these facilities to the existing sewage treatment plant. The southernmost part is to have 50 tent campsites. No additional roads or parking areas will be required to service this tent camping area. A trailer dumping station and water fill facility, and a parking area for 32 vehicles will be constructed near the entrance.

The October, 1973 estimated cost for these facilities was $267,500.

Lone Point Access Area

This area provides camping, boat launch ramp and family picnicking. New construction will convert the picnicking area to overnight camping facilities and improve the camping area.

An additional 67 camping units will be added to the area. The addition of these 67 sites will require new roads, waterborne comfort stations, and electrical and water supply facilities. In addition, 14 of the existing campsites will be improved and a centrally located washhouse will be constructed to serve the entire camping area. A trailer dump station and water fill facility, together with 25 overflow parking spaces, will be constructed just south of the entrance control area. The existing sewage treatment plant will require a flow equalization tank.

The estimated cost, dated October, 1973, was $343,600.

Coon Creek Access Area

This is primarily a camping area and has 155 campsites of which 128 have electrical hookups. There is a boat launch ramp, a trailer dumping station, shower and laundry building, as well as other facilities.

New construction will add 90 campsites, part on a site a quarter of a mile west of the existing entrance facility. It has lake frontage, and is a wooded site to contain 67 campsites, roads, a parking area, three waterborne type comfort stations, and a sewage lift station. The second new camping area will be just southwest of the entrance and will provide 23 campsite units. A loop access road and a waterborne comfort station are required.

Estimated cost, as of October, 1973, was $399,700.

Lithia Springs Access Area

This is the most diversified of the public access areas, providing camping, picnicking, boating access, commercial concessions and a marina. The existing 130 camp units are to be supplemented by expanding the camping to the north along the eastern shoreline of the lake. On two peninsulas a total of 58 additional campsites will be developed. Four double vault-type comfort stations, 3,200 feet of bituminous road, and electrical and water supply facilities will be required to support these new campsites. Two group picnic shelters and a group fire circle will be added.

One double vault-type comfort station will be constructed to serve one of the existing camping areas. A new parking lot with a capacity of 32 cars will be constructed at the entrance area.

The October, 1973 estimate of cost for these facilities was $375,800.

Planned Construction

The present Master Plan for Lake Shelbyville is currently being revised. Over the next five years little expansion of camping and picnic facilities is expected beyond those presently under construction. Plans for the next five years will generally aim at expanding the type of facilities available at Lake Shelbyville. Under consideration are primative walk-in tent camping areas, boat camping and picnic sites, an ecological study area, organized group areas including an area with cabin facilities, and concession areas for overnight accommodations, including resort-type developments.

Operation for Flood Control

From an operational standpoint, the 474,000 acre feet flood control pool (elevation 599.7 to 626.5) has releases ranging between a minimum of 10 c.f.s. and a maximum of 4,500 c.f.s.

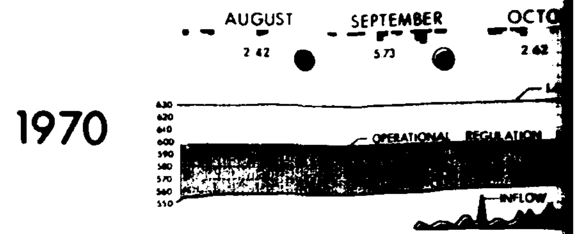
During normal periods the water level of the pool is regulated to maintain a prescribed elevation as closely as possible. Two sets of prescribed pool elevations and two corresponding schedules of water release are proposed. The Plan VI Schedule of Releases is being used during the interim period before the navigation project near Chester, Illinois, becomes operational. Plan VII Schedule of Releases is to be used after the project becomes operative. The major difference between the two Schedules of Release is that the latter is intended to maintain a higher minimum pool elevation during the winter in order to assure adequate water should releases for navigation be required.

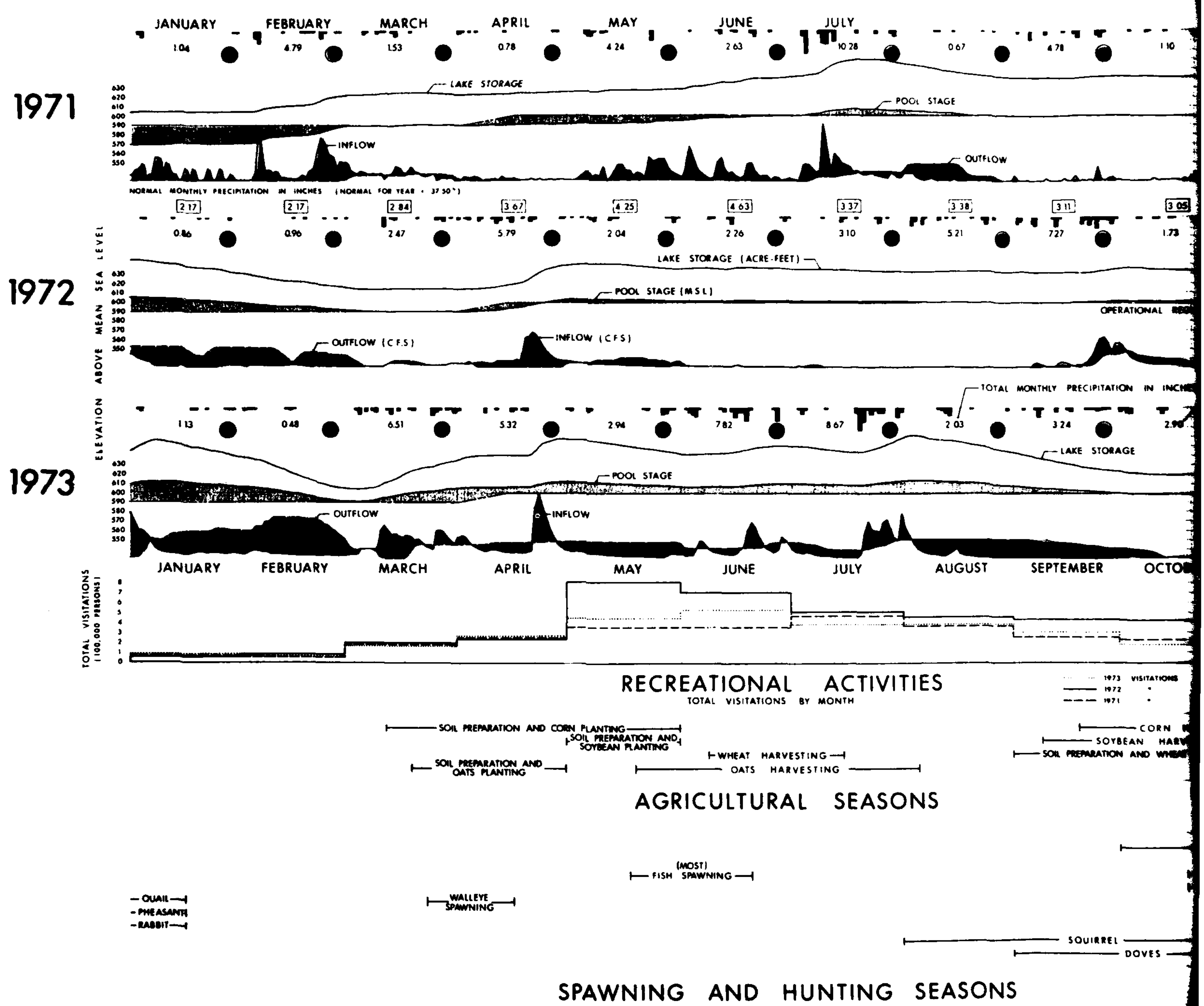
In order to maintain the pool at the prescribed elevation, variation in releases to conform to inflows is necessary. (See Plate I-3.) Both Schedules of Release have regulations in common for releases. When inflow increases to the extent that the pool stage tends to exceed the prescribed

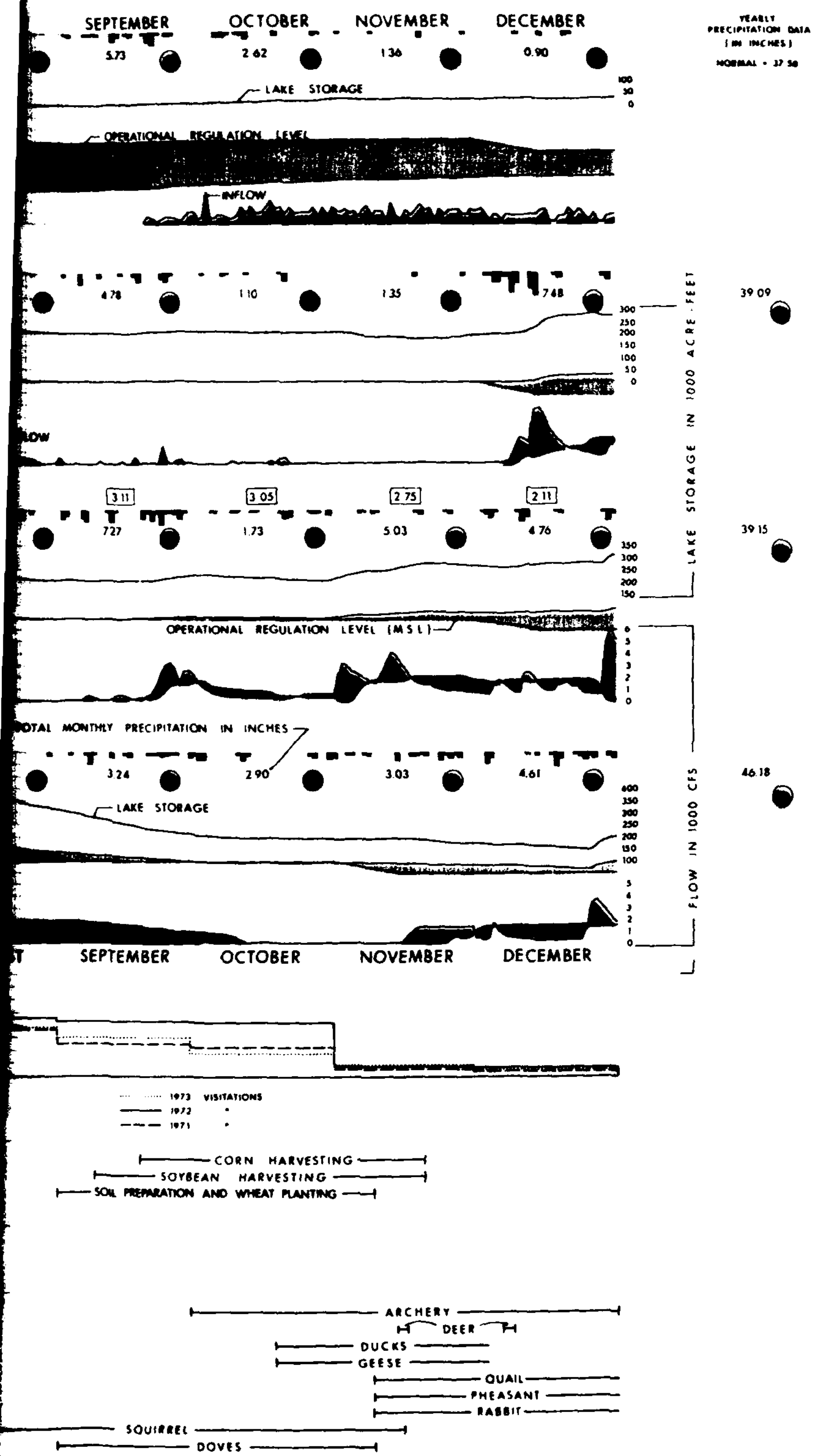
SOURCE: MONTHLY LAKE REGULATIONS AND PRECIPITATION DATA FROM
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
LMVS FORM NO. 945

RECREATIONAL VISITATION DATA FROM
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
LMV FORM 264

AGRICULTURAL DATA FROM
ILLINOIS COOP CROP REPORTING SERVICE
ILLINOIS DEPARTMENT OF AGRICULTURE
U.S. DEPARTMENT OF AGRICULTURE
BULLETIN 73-1







ONS

MONTHLY LAKE REGULATION AND SEASONAL ACTIVITIES

- POOL ABOVE OPERATIONAL REGULATIONS
- POOL BELOW OPERATIONAL REGULATIONS
- INFLOW EXCEEDING OUTFLOW
- OUTFLOW EXCEEDING INFLOW
- 3.72 NORMAL MONTHLY PRECIPITATION IN INCHES
- 2.57 ACTUAL MONTHLY PRECIPITATION IN INCHES
- PERCENT OF NORMAL PRECIPITATION (ABOVE NORMAL)
- PERCENT OF NORMAL PRECIPITATION (BELOW NORMAL)

PLATE I-3

2

elevation, the releases are increased sufficiently (not to exceed 1,800 c.f.s. below pool elevation 610) to maintain the prescribed pool level. In times of downstream flooding the release is held back to minimize the impact downstream. Above elevation 610 the release is seasonably dependent. In January, February, March, April, and December the release goes to 4,500 in 24 hours after the pool exceeds 610. In all other months the release is gradually increased from 1,800 c.f.s. at 610 to 4,500 c.f.s. at 626.5. Between pool elevations 626.5 and 610, the release is also seasonably dependent. For the five months previously mentioned, the release is kept at 4,500 c.f.s. until the pool falls to just above elevation 610; then, the release is decreased to 1,800 c.f.s. within a day. The other months of the year the release is gradually reduced from 4,500 c.f.s. at 626.5 to 1,800 c.f.s. at 610. As the pool falls below elevation 610, 1,800 c.f.s. is maintained until the prescribed elevation is reached. When the pool stage tends to receed below the prescribed level, a minimum release of 10 c.f.s. is maintained until increased inflow raises the pool level to the prescribed elevation. All inflow in excess of the maximum regulated release (1,800) is stored for later release.

Above 626.5 feet (the top of the flood-control pool), four feet vertical depth of induced surcharge storage is to be utilized for control of unusually rare floods too large to be contained in the flood-control pool.

The operation Plan VI (see Plate II-11 for details), with its schedule of releases related to pool elevation, was the result of an extensive reanalysis of the joint operation of Lake Shelbyville and Carlyle Lake (U. S. Army District Engineers, St. Louis, 1 December 1969). This reanalysis considered nine alternate operating plans to determine which schemes of regulating the two lakes would result in the least damage and greatest feasibility based on hydraulic considerations. The schemes were all fundamentally the same in the general assumptions concerning lake releases. Various alterations were made in the assumptions of the joint-use pool elevation, recreation damage, flood control releases, months for winter flood control releases and winter drawdown elevations. Appendix E describes, in some detail, the considerations leading to the choice of Plan VI for operation of the Lake Shelbyville flood-control storage and releases prior to completion of the downstream navigation project.

A second long-range operating plan, VII, will be adopted when the navigation project is in operation. The primary difference is that for the months of December through March, pool elevation will be drawn down to 596, rather than 590. It will be maintained at 599.7 for the balance of the year. This difference is to insure more available water for navigation purposes through the winter months.

If the pool surface elevation exceeds 630.5, the outflow would be uncontrolled. All of the gates would be fully open until the pool surface falls to 630.5. Outflow would then conform to a specified schedule of water releases until elevation 626.5 is reached, when the outflow would be reduced to 4,500 c.f.s.

To develop the spillway design storm unit hydrographs were determined from floods of record. The "Standard Project Flood" and the hydrographs for spillway design floods (with a choice of spillway design storm), were also determined. The Standard Project Flood represents the flood that may be expected from the most severe combination of meteorologic and hydrologic conditions considered to be reasonably characteristic of the geographical region involved. The chosen spillway design flood was routed through the proposed spillway design to determine the probable peak outflow rates. The ultimate spillway length and crest elevation are derived from the Standard Project Flood results. The spillway design hydrographs were routed through lake storage starting with pool stage 626.5 (the maximum pool stage for the period of record routing was 616.5). As constructed, the spillway design assumed a rainfall total of 22.14 inches for six hours and a net runoff of 19.12 inches into the lake. The inflow hydrograph would have a peak of 415,000 c.f.s. The maximum pool elevation reached was 638.2 feet, with a maximum outflow of 162,500 c.f.s. As a corollary to developing the spillway design hydrograph and actual design for the entire lake structure, studies of wave heights and wind tides determined that the freeboard of 4.8 feet, as finally used, is conservative. The maximum computed value of freeboard requirement for the dam was determined to be 3.75 feet for a wind velocity of 65 mph over water. (U. S. Army Engineers District, St. Louis, 29 December 1960).

Operation for Water Supply

The project design provides for total joint-use storage of 180,000 acre-feet between pool elevations 573.0 and 599.7 (normal pool). Of this total, 155,000 acre-feet are allocated for navigation purposes, with the balance (25,000 acre-feet) allocated for water supply (subject to State of Illinois control usage). To date, no demand has been made by any local municipal or industrial interest for use of Lake Shelbyville water for water supply. Consequently, the lake is not presently being operated specifically for the purpose of water supply.

Operation for Navigation

The joint use pool of Lake Shelbyville was designed to be generally maintained at 599.7, normal pool elevation, except for the winter months. Of the storage in this pool, 155,000 acre-feet are to be used for navigation purposes with a minimum release of 10 c.f.s. at all times. This minimum is for downstream water quality control. During periods of low flow in the Kaskaskia River, releases would be made for the benefit of Kaskaskia River navigation.

After the Kaskaskia Navigation Project goes into operation, Lake Shelbyville will be operating under Plan VII. The extra water stored during the winter will be required to supplement the navigation releases during low flow periods. Lake Shelbyville and Carlyle Lake will share equally the

navigation deficiency, which is equal to the extra water required to supplement natural flow on the lower Kaskaskia River for Navigation.

To date, the Kaskaskia Navigation Project is not complete and, therefore, Lake Shelbyville is not currently operated for the purpose of navigation.

Operation for Recreation

Recreational operation and maintenance have the objective of providing the visitor with a rewarding recreational experience. This is done by providing maximum facility use despite water level fluctuations, offering a variety of family-oriented recreational activities, preserving the area's "natural" character despite development, and allowing maximum visitor use of the area without endangering themselves, other visitors, or the facilities.

Maximum Use of Facilities Despite Water Level Fluctuations

To maximize the recreational use of Lake Shelbyville, numerous operational techniques have been employed. To lessen the adverse effects of high water, all permanent structures (such as picnic shelters and comfort stations) have been placed above elevation 610 feet, with most being well above this elevation.

Water level fluctuations also have a significant impact on lake use. Boat launching ramps, boat docks and swimming beaches can be adversely affected.

Boat launching ramps have been constructed with abnormally long approach and launching ramps. This allows for visitor use between pool levels 583-586 feet and 610 feet. Special navigational channels have been dredged, linking the boat launching ramps with deep water areas. These channels and floating docks make marina facilities available to boaters despite the lowest or highest water levels recorded since the lake first reached elevation 599.7.

Five swimming beaches are located at Lake Shelbyville. The man-made beaches are located to encourage maximum visitor use. These facilities are operable between pool elevations 597 and 603 feet. Beach use during the recreational season has been restricted for 161 days because of high water. The swimming beaches can be used 60 percent of the time from May through September.

To increase the project's flood control and navigation capability, the water level is lowered during winter months to elevation 590 feet. While increasing the lake's flood storage capacity in early spring, the drawdown can adversely affect recreational use if normal pool has not been obtained by the first of June.

Offering a Variety of Family-Oriented Recreational Activities

A variety of land-oriented facilities supplement lake use. Primitive and developed campsites, 10 playgrounds, picnicking, and pleasure driving interest most age groups. During the 1973 recreation season, park aides were employed to control access to campgrounds and provide supervision. The program proved successful from both a visitor and environmental point of view. Controlled access to the campgrounds eliminated conflicting uses, minimized traffic congestion, and increased camper safety. Supervision also eliminated frequent crowding and overuse of camping sites and facilities. The camping expectance improved in quality on both a short and long-term basis.

Campground F was opened in 1973 to serve as an overflow camping area. Previously, overflow demands were handled at individual access campgrounds. Campground F is used only when all other campgrounds have been filled to capacity.

Currently, minimal facilities to educate the visiting public about the natural and man-made (dam) environment are provided. A booklet which guides visitors along the one-half mile nature trail at the Coon Creek access area, four small displays in the administration center, 13 strategically located bulletin boards, and equipment to provide special programs (regularly scheduled programs are to be provided this year) form the basis of the interpretive program. Tours of the dam are provided on an irregular and informal basis by rangers on a voluntary basis during their off-hours.

Highly developed facilities which require greater than normal investments are handled on a concession and fee basis. To date, the marinas are the only concessions being operated at the lake. Two of the facilities are proving economically successful, while the third is in a poor financial state. A fourth concessionaire is currently being sought.

The fee collection system was initiated prior to the 1973 recreational season, as provided under authority of Public Law 92-347. User fees are collected only for use of areas with specialized facilities. Fees are collected for all campsites provided with flush toilets, hot showers, paved or dustproofed roads, 24-hour surveillance, picnic tables, foreplaces, and designated tent or trailer spaces. No fees are collected for less developed sites which do not contain all these facilities. In 1973, $69,122 in fees were collected by the Corps of Engineers and the State of Illinois.

Preservation of the Project Area's Natural Character

The visitor's impression and enjoyment of an area is directly affected by operation and maintenance procedures. Preservation of the natural environment and a high maintenance level are essential if the project is to emphasize the area's "natural" character.

The problems of dead trees and shoreline erosion require remedial measures. Dead trees present safety hazards in the heavy use areas and tend

to lower the natural beauty of the shoreline. Shoreline erosion is an increasing problem at Lake Shelbyville, as is shown on Plate II-20. These two problems are directly related to high pool levels. Future high pool elevations will cause more shoreline tree kills and shoreline erosion.

Dead trees present a safety hazard in heavy use areas and tend to lower the natural beauty of the shoreline. These flood killed trees are left to fall naturally and decompose except in heavy use areas where they are removed for visitor safety. This procedure does little to improve the aesthetics of the shoreline but lake visitors are generally protected from falling branches and trees. As time goes on, nature will naturally remove these dead trees and replace them with other vegetation.

High water levels plus high winds have caused considerable shore erosion at Lake Shelbyville. This shore erosion will continue until a natural beach is formed. This problem, though, is compounded by the fluctuating pool. While a natural beach may form at elevation 600 feet, shore erosion will start again when the pool rises to elevation 610 feet. The alternative to shoreline erosion is protection. Past experience, though, has shown that protection is not easy. Because of the fluctuating pool, vegetative means to stabilize erosion almost always fail. High water is not, in itself, the cause of this failure but it is the unnaturally long periods of time that high water can last during critical growing periods. Protection thus means riprap, sheet piling, or other unnatural means. Extensive riprapping, which is the least costly method, is distructive to the concept of a natural shoreline plus enormously expensive.

A compromise between no action and artificial protection thus has been taken. Only areas where major developments are located will be protected while the remainder of the lake's shoreline will be allowed to assume a natural angle of repose. This will essentially maintain the natural character of the shoreline while protecting the investment in those areas where major facilities have been placed. Shoreline erosion, though, will continue to distract from the beauty of the lake for many years to come.

Restricted use (mooring and docking restrictions) and inaccessibility to certain portions of the shore helps preserve existing banks and vegetation, while contributing to visitor safety.

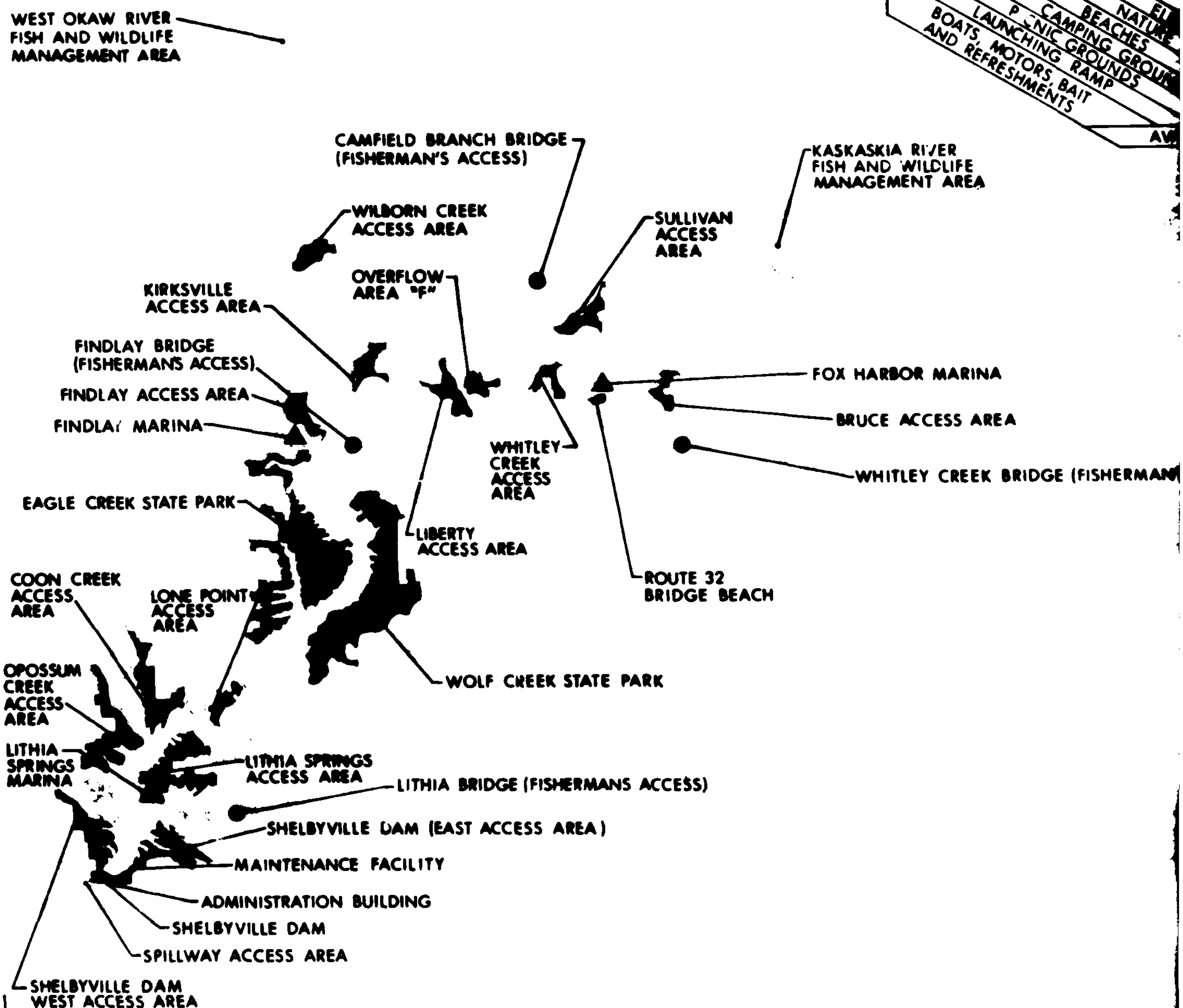
Visitor behavior is influenced by how clean and well maintained an area is. To encourage optimum behavior, a higher than normal maintenance schedule is followed. Maintenance duties are performed by both Corps personnel and by private contractors.

Corps maintenance headquarters, with staff and equipment, is located approximately one-half mile northeast of the Administration Building. (See Plate I-4.) This location provides good access to utilities, the City of Shelbyville, the dam, and several heavily used recreation areas.

Maintenance headquarters includes a main building 40 feet by 100 feet that is heated, has office area, restrooms, and is principally used for a shop area, locked storage for tools and supplies, and some space for storing

PUBLIC USE AREA	AVAILABLE RECREATION FAC						
	BOATS, MOTORS, BAIT AND REFRESHMENTS	LAUNCHING RAMP	P ⌐NIC GROUNDS	CAMPING GROU	BEACHES	NATURE	EL
SHELBYVILLE DAM EAST ACCESS AREA			X					
SPILLWAY ACCESS AREA			X					
SHELBYVILLE DAM WEST ACCESS AREA		X	X		X			
OPOSSUM CREEK ACCESS AREA		X	X	X				
COON CREEK ACCESS AREA		X		X	X	X	X	X
LONE POINT ACCESS AREA		X	X	X				
WILBORN CREEK ACCESS AREA		X	X		X			
SULLIVAN ACCESS AREA		X	X	X			X	X
WHITLEY CREEK ACCESS AREA		X		X				X
LITHIA SPRINGS ACCESS AREA		X	X	X	X			X
EAGLE CREEK STATE PARK		X	X	X				
WOLF CREEK STATE PARK		X	X	X				
WEST OKAW RIVER WILDLIFE AREA								
KASKASKIA RIVER WILDLIFE AREA								
[illegible]	X	X						
[illegible]	X	X						
[illegible]	X	X						

AV



ADMINISTRATION OF PROJECT AREA

...EA	BOATS, MOTORS BAIT AND REFRESHMENTS	LAUNCHING RAMP	PICNIC GROUNDS	CAMPING GROUNDS	BEACHES	NATURE TRAILS	ELECTRICAL HOOKUPS	SHOWERS	LAUNDRY	TRAILER DUMPING STATION	ACRES
[illegible]			X								293
[illegible]			X								59
[illegible]		X	X		X						140
[illegible]		X	X	X							580
[illegible]		X		X	X	X	X	X	X	X	296
[illegible]		X	X	X							137
[illegible]		X	X		X						204
[illegible]		X	X	X			X	X	X	X	159
[illegible]		X		X				X	X	X	100
[illegible]		X	X	X	X			X	X	X	496
[illegible]		X	X	X							1655
[illegible]		X	X	X							1480
...IFE AREA											2600
...IFE AREA											3500
[illegible]	X	X									
[illegible]	X	X									
[illegible]	X	X									

AVAILABLE RECREATION FACILITIES

KASKASKIA RIVER FISH AND WILDLIFE MANAGEMENT AREA

FOX HARBOR MARINA

BRUCE ACCESS AREA

WHITLEY CREEK BRIDGE (FISHERMAN'S ACCESS)

CORPS OF ENGINEERS ADMINISTRATIVE LANDS

- PUBLIC ACCESS AREAS
- UNDEVELOPED AREAS
- FLOWAGE EASEMENTS
- FISHING ACCESS AREAS

OUT GRANTED LANDS

- STATE PARKS
- STATE FISH AND WILDLIFE MANAGEMENT AREAS
- CONCESSIONAIRES - MARINAS

PLATE I-4

2

small pieces of equipment. A shed 20 feet by 160 feet, open on one side, provides storage for boats and farm-type equipment such as a seeder, disc, mower and tractor. Other miscellaneous facilities include incinerator for disposal of burnable refuse, washstand for cleaning various vehicles fuel dispensing station, access road and parking, and surface maintenance yard.

Originally, the total staff for Maintenance and Operation assigned to Lake Shelbyville was 32 persons, including office, secretarial and management. At present, the total staff for Operation and Maintenance numbers only 18 persons. (See Plate I-5.) This reduction results partially from part of the maintenance being performed by contract. The maintenance staff includes, to the extent possible, skilled tradesmen such as the Engineer Equipment Mechanic (in charge of maintenance and repair of equipment), carpenter, plumber, electrician, cement finisher, and a specialist on instrumentation who is in charge of all instruments such as the diflectometer, piezometer, and various gauges including their care and reading.

Corps personnel are primarily responsible for inspecting all areas and facilities, providing minor repairs and preventative maintenance, and maintaining and servicing the hydraulic structures. When available, the work force is working on improvement projects. Some of the projects undertaken include the lookout tower on the Coon Creek Nature Trail, fee booths at the entrance of each camping area, fishing piers, and nature trails. Other maintenance activities include replacement of sand at beaches, realignment of protective buoys, erosion repair, seeding, fertilizing, tree and shrubbery planting, maintenance of trails, painting, repair of facilities (benches, tables and signs), road maintenance and repair, maintenance of comfort stations, shower buildings, miscellaneous facilities, and preventative maintenance - particularly on all buildings.

Private contractors are responsible for the mowing and cleaning of all camping and picnicking areas and facilities developed by the Corps. Contractual cleaning and mowing is let for competitive bidding in conformance with detailed work requirements and specifications.

Mowing and Trimming

The mowing and trimming contract provides for maintenance of Lithia Springs (approximately 68 acres), Coon Creek (approximately 69 acres), Opossum Creek (approximately 68 acres), Lone Point (approximately 46 acres), Dam East (approximately 40 acres), Wilborn Creek (approximately 81 acres), Sullivan (approximately 64 acres), and Whitley Creek (approximately 32 acres).

The service required includes mowing (estimated) eight times per contract period and trimming (estimated) six times - depending on the prevailing weather conditions, or as required to maintain the vegetation at a height of between four inches and eight inches.

The total amount of the mowing and trimming contract awarded to a regular dealer and an individual in 1973 was for $63,132.00. The average cost per acre was $9.65 for mowing and $3.60 for trimming.

ORGANIZATIONAL CHART

OPERATIONS DIVISION

RECREATION-RESOURCES MANAGEMENT BRANCH	
W.O. Hartke	Chief
Supvr. Civil Engr.	GS-13
Ext. 2130	LMSOD-R
1 Civil Engineer	GS-12
1 Outdoor Rec. Planner	GS-12
1 Civil Engr. Tech.	GS-11
1 Wildlife Biologist	GS-12
1 Civil Engineer	GS-11
1 Civil Engr. Tech.	GS-9
1 Outdoor Recreation Planner	GS-9
1 Forester	GS-9
1 Clerk-Stenographer	GS-4

LAKE SHELBYVILLE MANAGEMENT OFFICE	
L.D. Meier	Park Manager
Park Manager	GS-12
P.O. Box 26, Shelbyville, Ill. 62565	
Area Code 217 774-3951	
1 Asst. Park Manager	GS-11
2 Park Ranger	GS-9
1 Park Ranger	GS-7
1 Reservoir Clerk	GS-4
1 Clerk-Typist (Temp)	GS-3
1 Res. Const.& Maint. Ldr.	L 05
1 Electrician	W 11
1 Heavy Mobile Equip. Mech.	W 10
1 Sewage Disposal Plant Opr.	W 09
1 Sewage Disposal Plant Opr.	W 07
1 Crane Opr.	W 09
1 Inst. Exam. & Recorder	W 08
1 Engr. Equip. Opr. Seasonal	W 08
2 Carpentry Wkr.	W 07
1 Plumbing Wkr.	W 07
2 Tractor Opr. 1 Seasonal	W 06
1 Engr. Eq. Mech. Helper Seas.	W 05
8 Res. Const.& Maint. Wkr. Seas.	W 05
8 Laborer } Seasonal	W 03
5 Laborer } Seasonal	W 02

PLATE I-5

Cleaning Services

Areas under the cleaning services contract are those having camping, picnicking, and including facilities which require cleaning, such as shower and laundry buildings, toilets and overlook shelters, picnic shelters, picnic tables, grills and fireplaces, trailer dump stations, refuse containers, fountains and hydrants, and fish cleaning stations. The services also include litter pickup, disposal of refuse, and disposal of waste pumped from toilet vaults. The schedule for cleaning and servicing is divided into two seasons. During the summer months (May 1 through September 30), areas are cleaned a minimum of once a day or more often as required to maintain sanitary conditions. During the winter months (October, November, March and April) areas are cleaned a minimum of three times a week, or as required to maintain sanitary conditions. A full-time attendant is provided by the contractor for Coon Creek, Lithia Springs and Sullivan Access Areas seven days a week, during the hours from 9:00 a.m. to 6:00 p.m., including all holidays from May 29 through September 15. Solid Waste is disposed of by the contractor at state approved landfills.

Sewage

Toilet facilities around the lake vary according to location, use levels and proximity to existing sanitary facilities. A variety of techniques has proved most effective for sewage treatment. These are as follows:

Package Treatment Plants

Area	Plant Size Gallons Per Day	Elevation of Surrounding Grade	Effluent Outlet Grade
Opossum Creek	10,000	626	622
Coon Creek	20,000	632	627
Lone Point	10,000	622	618.5
Lithia Springs	20,000	625	624
Wilborn Creek	15,000	635	632
Sullivan	17,000	622	618
Whitley Creek	16,000	621	619
Corps Administration Building, Dam East Maintenance Area and East Spillway	5,000	641	637
Fox Harbor Marina	7,000	634	627.5

These treatment facilities produce effluents with only 4 ppm B.O.D., 5 ppm suspended solids, and less than 1 ppm phosphates. The plants have all been sited at or above the 618-foot elevation, which is comparable to the 50-year flood elevation. When flood levels above 618 are anticipated, the plants are pumped, cleaned and filled with water prior to inundation. Lithia Springs Marina is converting from vault-type to waterborne, which will be connected to the Corps treatment plant at Lithia Springs.

Dam West and the West Spillway access areas are both pumped into the Shelbyville sewer system.

Vault-type toilets serve all the remaining Corps areas, State Park areas, and private concessions. These units are pumped prior to the 70 percent full level and the waste is removed. Effluent removed by the private contractors is disposed of at state approved sewage treatment plants. Contractors are required to turn over to the Corps treatment plant receipts showing that proper disposal techniques were followed.

The discharge of marine toilets is regulated by state law and Corps Title 36 regulations. Most boats on the lake are used for short-term recreational use and do not require toilet facilities. Usually, land-based sanitary facilities are readily accessible and adequate. Marine toilet pumpout facilities are available at Findlay and Lithia Springs Marinas. The facilities are well located in relation to the origin and destination of large boats.

Special Contracts

Special contracts or work orders are also awarded occasionally for refuse or waste removal and disposal that is not covered by previously discussed contracts, such as off-season cleaning of vault-type toilets. Also under special contracts are maintenance specialists such as radio repairmen.

The Corps of Engineers oversees all facilities and activities on the 34,408-acre project area. Project lands leased to the State of Illinois and to private concessionaires are inspected regularly by Corps personnel. Corps of Engineers' rangers assume principal responsibility for overseeing all project lands. The ranger's primary function is to assist the public in using the facility. This includes giving directions, answering questions and, in general, making the visitor's stay more rewarding. While patrolling the entire project area, he must enforce regulations and protect government properties and facilities.

Three park rangers are responsible for this work. (See Plate I-5.) During the 1973 recreational season, 22 park aides assisted the rangers by collecting camping fees, controlling access, and providing campground supervision. These part-time employees were recruited locally and were composed of college students and high school instructors.

To minimize conflicts between various activities, three special areas have been set aside. The park aides restricted campground access to campers.

The elimination of sightseers from the facility proved successful because it eliminated conflicting uses, while minimizing traffic congestion and increasing camper safety.

Similar controls have been initiated to protect swimming areas. Buoy lines keep boats a safe distance from the swimmers, warning boaters where swimmers are.

A 300-foot no-wake zone protects the entire lake shoreline from erosive wave action. It also serves to separate the potentially conflicting activities of fishermen and power boaters. No-wake zones have also been created in specially designated coves.

Operation for Fish and Wildlife Conservation

The Illinois Department of Conservation has a management plan for the 6.231 acres outgranted to them for the purpose of fish and wildlife management. The Illinois Natural History Survey works in cooperation with the Department of Conservation in management of a fisheries - waterfowl marsh. Monitoring of stream and lake water quality is done by the Illinois Natural History Survey. Non-leased fee-owned lands are managed according to "compartments", or small segments surrounding the lake. There is a total of 63 compartments, and they are analyzed and treated on a rotating basis.

Fisheries Management

Operation of lake levels for the purposes of fish management includes maintenance of stable or slowly rising water levels during critical spawning seasons (approximately May 15 to June 15), and possible fall and winter drawdowns to increase predation success and productivity. No drawdowns have yet been implemented, but the technique would be used during fall and winter. Once each five years, or when needed as determined by fish population and physical conditions surveys, the lake would be drawn down to a pool level of 583 m.s.l. as rapidly as downstream conditions permit and being consistent with other recognized joint pool uses.

The Division of Fisheries of the Illinois Department of Conservation is responsible for aspects of fish management at Lake Shelbyville which do not pertain directly to changes in the surface elevation of the lake. The fish management program is supervised by a professionally trained Reservoir Fisheries Biologist stationed at Carlyle Lake.

Northern pike, walleye, bluegill, and largemouth, smallmouth and white bass have been stocked in the hope that self-maintaining populations will become established. Nursery ponds have been used to aid in the stocking programs. About 200,000 largemouth bass were raised to the 3.5 to 4-inch size prior to release from an enclosed 200-acre marsh area which is operated jointly by the Illinois Natural History Survey and Illinois Department of Conservation. Continuing use of the enclosed marsh area as a nursery pond is proposed. Additional construction and use of nursery sub-impoundments is also proposed. No stocking or management of non-game fish has been implemented.

In order to collect data to guide in management, a reproductive survey and a fall fish population survey are conducted annually by the Department of Conservation. Angler creel census surveys and other biological investigations are conducted when deemed necessary.

Water Quality Monitoring

The Illinois Natural History Survey is under contract to conduct water quality and biological tests at ten test sites at Lake Shelbyville. Four stations are in the lake, five are in tributaries, and one is below the dam. The properties tested for include air and water temperature, dissolved oxygen, pH, carbon dioxide, fecal coliform bacteria, total alkalinity, chlorides, turbidity, chemical oxygen demand, total hardness, specific conductance, iron, nitrogen, ortho phosphate, total phosphate, sulfates and plant pigment. Sampling is done once each month from November through April, and bi-monthly May through October. Benthic communities are sampled quarterly.

Wildlife Management

The objective of the wildlife management program is to produce the maximum number of wildlife species needed for the use and enjoyment of the public, consistent with the joint-use objectives of the lake project.

Compartments covering all fee-owned land will be examined and management techniques recommended and implemented. This program of preparing "prescriptions" for compartments will start with 20 percent of the total area and, at the end of five years, all compartments and areas will have prescriptions. From then on, one-fifth of the compartments will be reviewed and prescriptions updated annually. Once a prescription has been prepared for field areas, lands management practices will be performed on approximately one-third of the open field acreage each year. Consequently, once every three years, each open land parcel will be treated.

Five general lands management practices or treatments will be used to develop or maintain wildlife habitat. Soil type, topography, elevation, size of area, access and land use will determine which practice or combination of practices will be used. Final determination will be made by the Lake Resource Development Ranger.

Practice No. 1 is used at developed recreation sites and consists of planting trees and shrubs which are beneficial to wildlife which may remain in the area.

Practice No. 2 will be used in areas where succession from the weed stage to shrub or tree stages will be permitted. In some cases cutting, herbicide treatment, or burning will be used to remove species which are least desirable to wildlife. Burning would be used on 10-acre or smaller plots, with fire safety crews and equipment present. Most burn plots will be below elevation 611.0, where removal of debris is desirable.

Practice No. 3 will employ discing, mowing and burning to maintain early successional stages of vegetation. Discing and mowing would be done after August 1 to minimize nest destruction.

Practice No. 4 includes methods from Practice No. 2, as well as planting of shrub rows. All fields larger than 20 acres will eventually be broken up by hedge rows. Autumn olive, lespedeza, and scotch pine will be used in most hedge rows.

Practice No. 5 calls for the planting of food plots near hedge rows and in areas where no private croplands are nearby. The crops recommended include buckwheat, milo, millet, soybeans, cowpeas, sorghum, clover, wheat, sunflower, and native prairie grasses.

In addition to management of vegetation for the benefit of wildlife, there is a program to increase the availability of nesting sites. Old, cavity-producing trees are to be preserved. Some nest boxes for wood ducks will be placed at sites which should be favorable for brooding and rearing.

Within the 6,231-acre areas leased to the Department of Conservation, management consists mainly of activities similar to Practice No. 3 and No. 4. The primary objective of management in these areas is to provide quality hunting and fishing for the public. Management plans are prepared annually by the state and submitted to the Corps of Engineers for approval.

Hunting is permitted on all fee-owned lands which are farther than 500 feet from a development or construction site.

Forest Management

The objectives of the Forest Management Program are to increase the value of all lake lands for recreation and/or wildlife. Fee-owned lands are classified into four categories in order to provide management for different land uses.

Class I areas include Corps administered, high-density recreation lands and administration areas. In these areas, intensive management, including both planting and maintenance, will be practiced. Non-native, as well as native, plant species will be used and management will be directed toward providing shade, buffer zones, and erosion control.

Class II lands include wildlife areas and lands influenced by recreation. Class II lands will be maintained to buffer Class I areas from outside influence and preserve a natural appearance around the lake shore and along roads. Some Class II areas may be developed into Class I areas. Management practices are intended to benefit wildlife and to preserve climax forest areas.

Class III and IV lands are leased to the Department of Conservation for the State Park and the Fish and Wildlife Management Area, respectively. Management is proposed and conducted by the state, but approved by the Corps of Engineers.

The same compartments are used under the Forest Management Program as for the Wildlife Management Program. The schedules for writing up and implementing prescriptions are also the same.

Possible Conflicts Between Project Purposes

The five project purposes authorized by Congress - flood control, navigation, water supply, recreation, and fish and wildlife conservation - are all implemented to the greatest extent possible by operation of Lake Shelbyville. In some cases, simultaneous operation to best promote two or more project purposes is difficult or impossible because of inherent conflicts. With five project purposes, there are 10 pairs of purposes (see Table I-4.), and the inherent conflicts possible between paired purposes are discussed below.

Navigation vs Flood Control

Flood control is best served by the greatest possible variability in pool levels. Considering flood control alone, the pool would be emptied during periods of low flow so that the greatest possible storage capacity would be available in anticipation of the next heavy runoff. If the pool were significantly lowered or emptied, insufficient water would be avialable to release for the benefit of downstream navigation during periods of low flow. Likewise, if water is retained for navigation, the flood storage volume is reduced.

Fish and Wildlife Conservation vs Flood Control

The extreme fluctuations in water level that best serve flood control prevent the establishment and maintenance of stable biological communities within the area subject to periodic inundation and dryness. Exposure of benthic communities will kill most organisms, as will prolonged inundation of terrestrial communities. If fish and wildlife are not directly affected, they may suffer from the impact on plants and invertebrates. Maintenance of a stable water level would eliminate flood control storage.

Recreation vs Flood Control

The extreme elevations of a fluctuating pool are not compatible with recreational use of the lake, either because of reduced water quality and surface area, or because of limitations on the use of structural facilities. Maintenance of a more constant water level reduces the flood control capacity of the lake.

Water Supply vs Flood Control

Flood control and water supply would conflict only at low lake levels when further lowering of the pool to increase flood storage capacity would endanger water supply. Maintenance of a minimum volume of water for water supply reduces flood storage volume.

Fish and Wildlife Conservation vs Navigation

Water withdrawn for navigation during droughts would lower the pool, damage shallow aquatic areas and limit fish habitat. Maintenance of a

Table I-4

ALL POSSIBLE PAIRS OF PROJECT PURPOSES

	Flood Control	Navigation	Fish and Wildlife	Recreation	Water Supply
Flood Control		Navigation and Flood Control	Fish and Wildlife and Flood Control	Recreation and Flood Control	Water Supply and Flood Control
Navigation			Fish and Wildlife and Navigation	Recreation and Navigation	Water Supply and Navigation
Fish and Wildlife				Recreation and Fish and Wildlife	Water Supply and Fish and Wildlife
Recreation					Water Supply and Recreation
Water Supply					

constant pool elevation would preclude navigational releases during dry seasons.

Recreation vs Navigation

Constant pool elevations maintained for recreation would prevent navigational releases. Navigational releases could reduce the pool elevation to the point that recreational possibilities were eliminated.

Water Supply vs Navigation

Water supply and navigation would be competing uses for stored water during low pool levels.

Recreation vs Fish and Wildlife Conservation

Land which is developed for recreational use is not suitable for most species of wildlife. Similarly, good natural or wildlife areas cannot support intensive recreation and still retain their value. There is no conflict with respect to water use or pool elevation.

Water Supply vs Fish and Wildlife Conservation

Withdrawals for water supply purposes could reduce water levels, especially during low flow. This would expose and damage benthic communities, and would leave a wide band of muddy open area between the water and the forest which could be detrimental to wildlife. Only extreme conditions would result in these conflicts in use.

Water Supply vs Recreation

Water supply withdrawals during drought could reduce the size of the pool and curtail recreation. Maintenance of constant pool elevations for recreation might restrict water supply withdrawals during dry periods. Intensive recreational development could adversely affect water quality.

The Concept of Multiple Use Management

Most of the conflicts between project purposes arise under extreme conditions which occur with a low frequency. More than one project purpose can usually be served at any given time if the degree to which it is served is limited; for instance, having restrictions against emptying the pool to increase flood storage capacity. Also, it is sometimes possible to design features of the project so that the conflicts between purposes have the least possible impact. For instance, recreation facilities can be built so that they are operable at a variety of water levels. The predictability of wet and dry seasons means that pool levels can be lowered during winter with only a small probability of dangerously reducing water supplies for the late summer dry spell. A similarly low level during early summer would involve a much greater risk.

The operation of Lake Shelbyville is intended to achieve the greatest possible benefit for each project purpose over the long run. Compromises are an inherent part of the operations, and some adverse impacts are inevitable.

Latest Economic Analysis

Summary of Project Benefits and Costs

Benefits		Total
a. Flood Damage Prevented		
(1) Kaskaskia River	$ 776,000	
(2) Mississippi River	312,000	
b. Enhancement		
(1) Cleared Land	282,000	
(2) Wooded Land	17,000	
(3) Urban	-0-	
Total Flood Control Benefits		$ 1,387,000
c. Irrigation		-0-
d. Navigation		36,000
e. Recreation		4,969,000
f. Fish and Wildlife		287,000
g. Water Quality Control		-0-
h. Water Supply		251,000
i. Redevelopment		-0-
j. Additional Redevelopment		-0-
k. Other		-0-
l. Negative Benefits		-0-
Total Project Benefits		$ 6,930,000

Benefit-to-cost ratio 2.2 to 1.

Flood control benefits are calculated for the total floodplain below the lake on which flood reduction is provided. Of the land on which flood damages are prevented, 33,390 acres are crop and 10,980 are non-crop. Classification of lands on which increased net returns have been determined is 15,100 acres of cleared land with a unit increase in net return of $ 18.68, and 260 acres of wooded land with a unit increase in net return of $ 65.38.

Navigation benefits are calculated as the incidental benefits to the Mississippi River based on values obtained from the "Mississippi River and Tributaries Benefit Study". Benefits to the Kaskaskia River Navigation Project reflect the savings in cost of the least costly alternative.

Recreation benefits are based on the estimated visitor-day attendance of 3,312,987 at $ 1.50 per visitor day. Fish and wildlife benefits are

based on the estimates of the U. S. Fish and Wildlife Services. Potential water supply benefits are calculated as benefits from the least costly alternative.

Costs

The economic life of the Lake Shelbyville project is estimated to be 100 years. Original interest rate on Federal and Non-Federal cost was determined at 2,625 percent. Amortization charges are based upon a 100-year ecomomic life of the project, except that a 50-year repayment period has been assumed for water supply costs.

Plans of Other Federal, State and Local Agencies

Outside of fee-owned property, the principal programs of other federal, state and local agencies have been in the area of improving the quality and accessibility of the road network around Lake Shelbyville. Current indications are that road improvements for this purpose will continue. For example, the State of Illinois is proposing to widen and resurface Route 16 from Middlesworth east to the Shelby-Moultrie County line, and to build a supplemental freeway through Shelby County to the west of Lake Shelbyville, serving Decatur to Salem as shown in Plate I-6.

Future road improvements by the counties will depend on the availability of Motor Fuel Tax Funds and perhaps Revenue Sharing. The exact nature of improvements will depend on the trends in lake use.

Within the project fee area, the Illinois Department of Conservation will continue to manage the State Parks and Fish and Wildlife Management Areas according to annual plans submitted to the Corps of Engineers for approval.

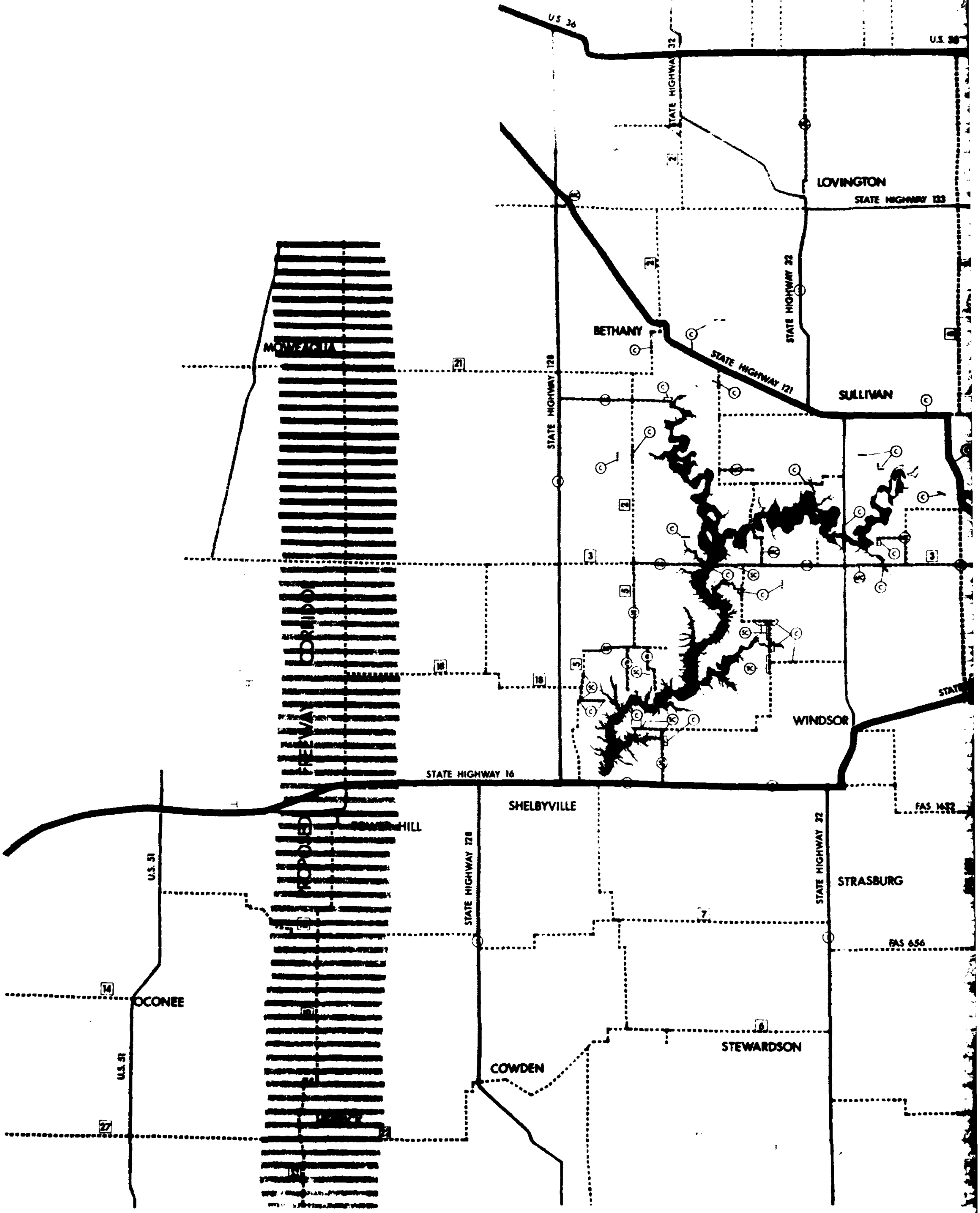
Table I-5

1973 ECONOMIC ANALYSIS OF THE PROJECT

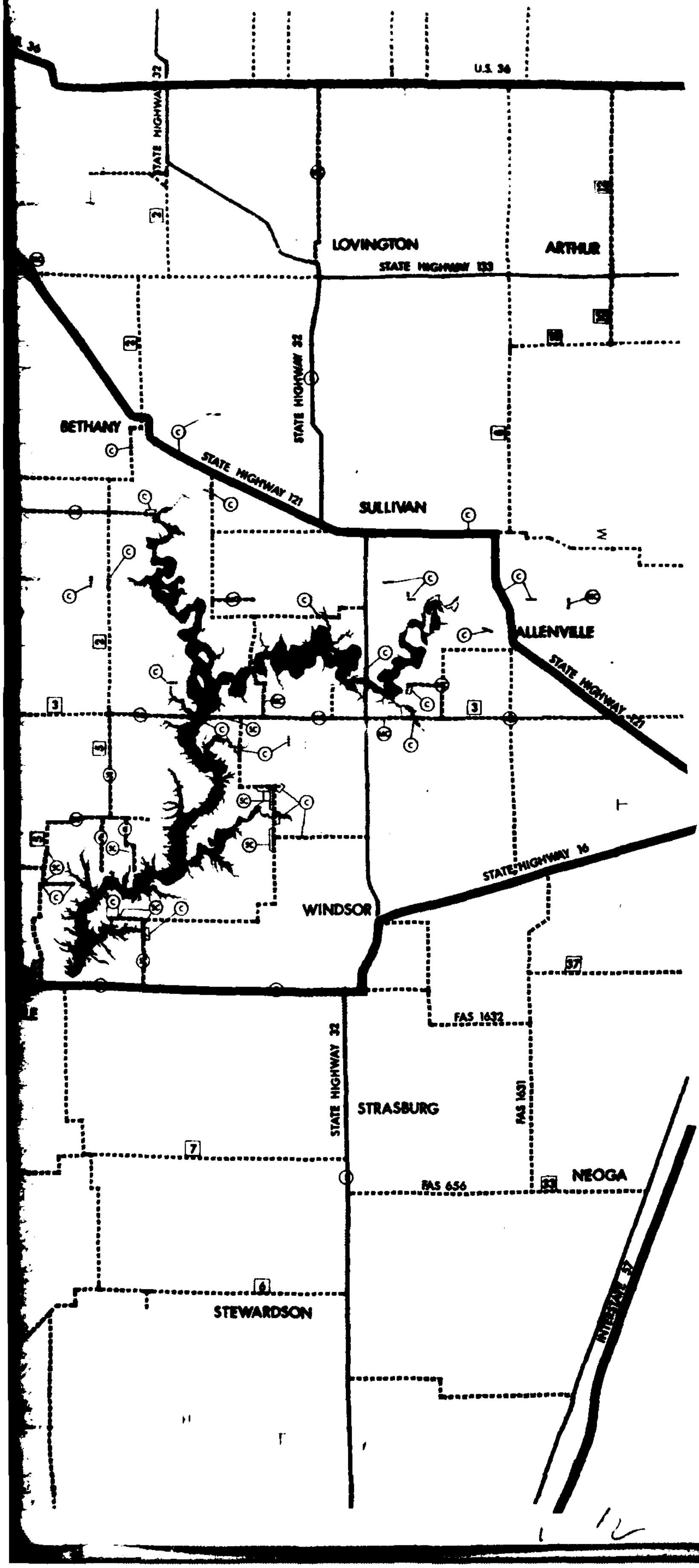
		Federal	Non-Federal
Estimated Construction Cost		$44,000,000	$16,800,000
Interest During Construction (Construction Period 11.0 years)		7,066,000[1]	2,426,000
Gross Investment		51,066,000	19,226,000
Salvage Value (minus)		--	--
Net Investment		51,066,000	19,226,000
Annual Charges	**Federal**	**Non-Federal**	**Total**
Interest Rate Used	2.625	2.625	
Interest	$1,340,000	$ 505,000	$ 1,845,000
Amortization (100 yrs.)	109,000	41,000	150,000
Maintenance & Operation	932,000	72,000	1,004,000
Replacements	27,000	2,000	29,000
Fish and Wildlife	--	--	--
Other (loss of taxes)	129,000[2]	--	129,000
Total Annual Charges	$2,537,000	$ 620,000	$ 3,157,000

(1) Includes $712,000 adjustment for loss of productivity during construction.

(2) Adjustment for net loss of productivity.



US 36
U.S. 36
STATE HIGHWAY 32
LOVINGTON
STATE HIGHWAY 133
BETHANY
STATE HIGHWAY 121
SULLIVAN
STATE HIGHWAY 128
21
3
18
WINDSOR
STATE HIGHWAY 16
SHELBYVILLE
U.S. 51
STRASBURG
7
FAS 656
FAS 1652
14
OCONEE
6
STEWARDSON
COWDEN
27



HIGHWAY MAP

ILLINOIS CLASSIFICA

- INTERSTATE
- MAJOR HIGHWAY
- AREA SERVICE
- COLLECTOR

[6] COUNTY HIGHWAY DESIGNATION

IMPROVEMENTS

RELOCATIONS AND IMPROVEMENTS DURING CONSTRUCTION OF PROJECT OR COMPLETED TO DATE.

- CORPS OF ENGINEERS PER DESIGN MEMOS NUMBERS 8-C1 & 8-C2
- STATE OF ILLINOIS
- SHELBY COUNTY (OR TOWNSHIP)
- MOULTRIE COUNTY (OR TOWNSHIP)

(COUNTY IMPROVEMENTS INCLUDE JOINT PROJECTS WITH CORPS OF ENGINEERS, WITH STATE AND LOCAL FUNDS)

RELOCATIONS AND IMPROVEMENTS UNDER CONSTRUCTION UNDER CONTRACT, OR IN DESIGN STAGE.

- CORPS OF ENGINEERS PER DESIGN MEMO NUMBER 11
- STATE OF ILLINOIS
- SHELBY COUNTY
- MOULTRIE COUNTY

PROPOSED IMPROVEMENTS

- MOULTRIE COUNTY
- STATE OF ILLINOIS
- STATE OF ILLINOIS (PROPOSED FREEWAY CORRIDOR)

SOURCE: ILLINOIS DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BUREAU OF PLANNING

PLATE I-6

PART II

ENVIRONMENTAL SETTING OF THE EXISTING LAKE

PHYSICAL ELEMENTS

Geological Elements

Geographic Setting

General. The Kaskaskia River drains an area of Midwest prairie farmland in south-central Illinois. The river orginates near the cities of Champaign-Urbana, Illinois, flows in a general southwest direction 325 miles across the state, and empties into the Mississippi River about eight miles north of Chester, Illinois. From its confluence with the Mississippi 50 miles upstream to Fayetteville, the Kaskaskia will be navigable when the Kaskaskia River Navigation Project is completed, thus forming a "spur" to the inland waterway that connects the ports of St. Louis on the Mississippi, Chicago on Lake Michigan, and Cincinnati on the Ohio. Lake Shelbyville Dam lies at river mile 222. The lake thus formed covers small portions of north central Shelby and south Moultrie Counties, both of which are predominantly rural. (See Plate I-1.)

Physical Setting. The Kaskaskia is dammed where it cuts across the Shelbyville Moraine, a wide rolling ridge formed by the leading edge of the Wisconsinan glacier along the line of its maximum southern advance. Here the stream gradient is steeper than above or below the moraine, the floodplain narrower, and the river rather deeply incised. The resulting body of water, averaging one mile wide, and covering 11,100 surface acres at normal pool (elevation 599.7 feet). The lower and middle reaches of the lake are bordered by bluffs and broken, tree-covered terrain. The upper reaches along the Kaskaskia and its tributary, the West Okaw, are more gentle, and the land adjacent to Lake Shelbyville blends into the surrounding prairie farmland.

In contrast to the steep, wooded terrain along the lower and middle portions of the lake, the flat to gently rolling prairie uplands are intensively cultivated. The major land use of Shelby and Moultrie Counties is farming, and approximately 86 percent of the upper Kaskaskia drainage basin is devoted to agriculture (Brigham, 1973). Corn and soybeans are the dominant crops.

Cultural Setting. Approximately one-half of the inhabitants of Shelby and Moultrie Counties live in municipalities or incorporated areas. These include Bethany, Lovington, Allenville and Sullivan in Moultrie County and Shelbyville, Findlay, Windsor and Moweaqua in Shelby County. The remainder of the population is rural.

Shelbyville and Sullivan serve as the trade centers for the surrounding rural area. They are also the largest towns in the immediate vicinity of Lake Shelbyville, and the seats of their respective counties. Several small industries are located in Sullivan, including a candy factory and a fertilizer plant (Brigham, 1973) and Shelbyville is the site of a polystyrene container manufacturing plant (State of Illinois, 1974).

Larger towns and cities within 100 miles of Lake Shelbyville include Decatur and Bloomington to the north, Springfield to the northwest, Vandalia to the south, Centralia to the southeast, Terre Haute, Indiana to the east, and Champaign-Urbana to the northeast. The metropolitan centers of St. Louis and Chicago lie outside the 100 mile range to the southwest and northeast respectively. (See Plate I-1.)

Federal and Interstate Highways are just outside the two-county area. (See Plate I-1.) Access from these highways to Shelbyville, Sullivan and Lake Shelbyville is provided by State Highways 16, 32, 121 and 128, and a number of secondary roads. Railroads serving the area are the Penn-Central, Chicago and Eastern Illinois,,and the Illinois Central Gulf.

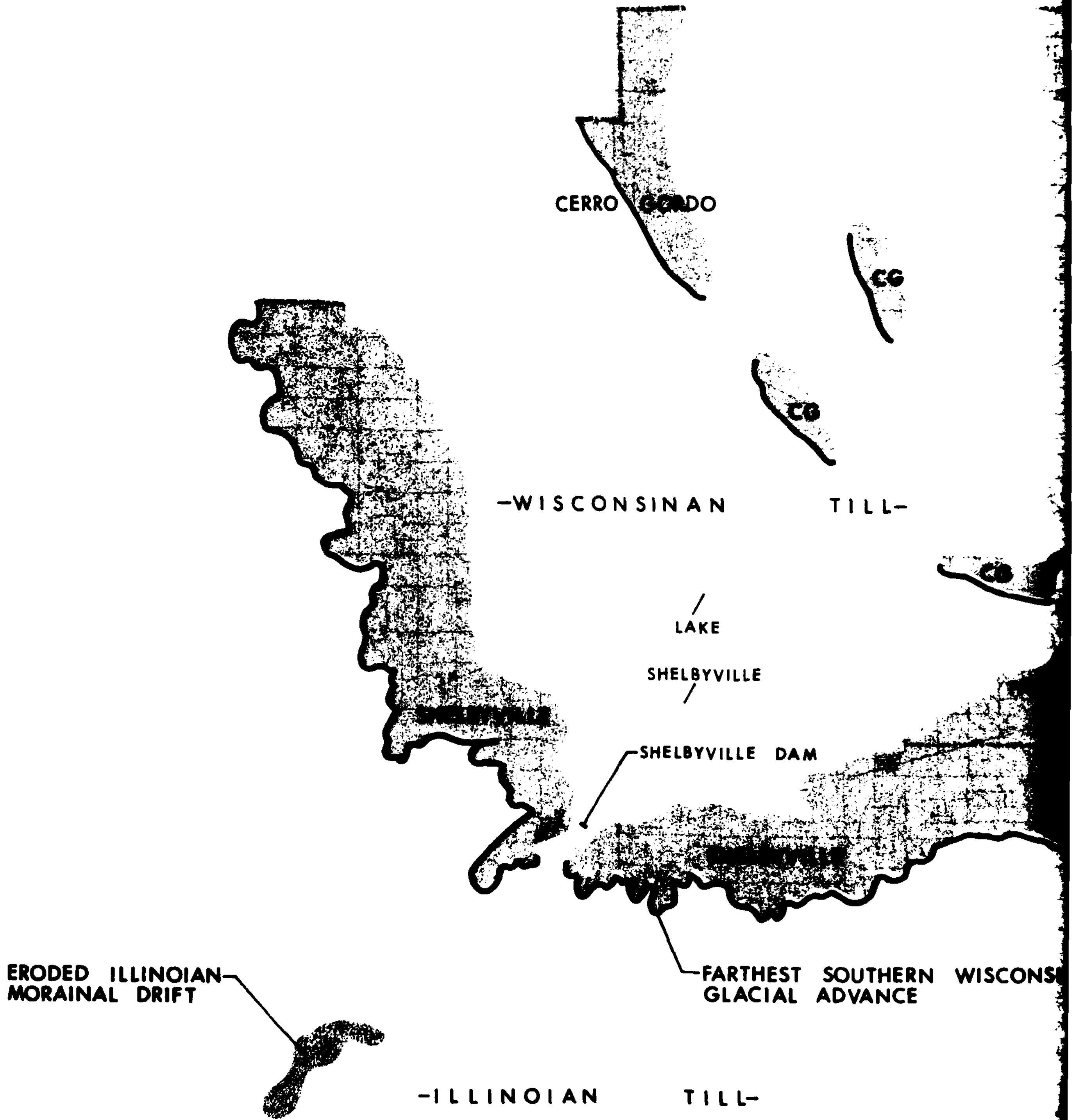
Other major recreational lakes and reservoirs in the region are Carlyle Lake (26,000 acres) on the Kaskaskia downstream from Lake Shelbyville; Rend Lake (18,900 acres) in southern Illinois south of Mt. Vernon; Crab Orchard Lake (6,579 acres) east of Carbondale, Illinois; Lake Springfield, south of Springfield, Illinois; and Lake Decatur (2,604 acres) southeast of Decatur, Illinois. (See Plate I-1.)

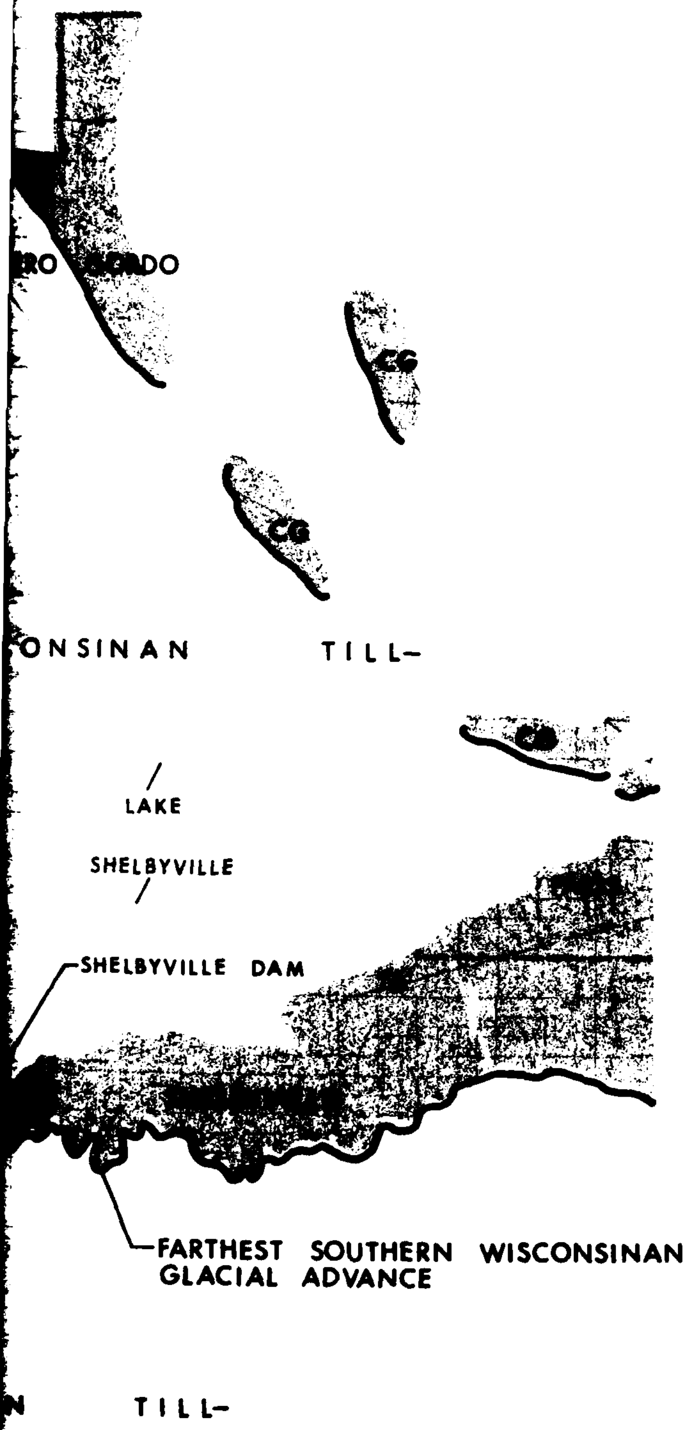
Physiography and Geomorphology

Regional Setting. Except for its extreme south and southwest portions, Illinois lies in the Central Lowland physiographic province, a relatively flat, low-lying, ill-defined topographic unit that encompasses most of the Midwest. During the Pleistocene, glaciers covered central Illinois, mantling the surface with a layer of till varying from 50 to 150 feet thick. Thus, the area is placed in the Till Plains section of the Central Lowlands (Leighton, 1948). As the till was deposited by the glacier, it filled stream valleys carved into bedrock, obscuring old topography. Because the rather evenly deposited glacial material is not much dissected, Illinois is essentially a prairie plain, presenting few physiographic contrasts. Local relief in most counties is less than 200 feet (Leighton, 1948), and such relief usually occurs along major valleys where rivers have cut down into the till.

Local Setting. The Shelbyville Moraine is particularly significant because it marks the maximum southward advance of the Wisconsinan glacier, and because it is one of the most prominent moraines in the State of Illinois (Odum, et al., 1962). It is a gently sloping wide ridge, the surface of which is somewhat rolling, with maximum local relief of about 80 feet (Wilson, et al., 1965). The Shelbyville Moraine divides the Till Plain into two physiographic sub-units based on the age and surface configuration of the glacial till.

The Bloomington Ridged Plain covers the area north of the moraine and includes the upper Kaskaskia drainage basin. Here the till was deposited about 20,000 years ago as the Wisconsinan glacier retreated and, because it is so young, there is litter geological erosion. In general, the area is flat, poorly drained, and contains only a few streams that have out shallow, narrow valleys (Wilson, et al., 1965). In Moultrie County, the most prominent surface feature is the Cerro Gordo Moraine (see Plate II-1)


CERRO GORDO
CG
CG
-WISCONSINAN TILL-
CG
LAKE
SHELBYVILLE
SHELBYVILLE DAM
ERODED ILLINOIAN
MORAINAL DRIFT
FARTHEST SOUTHERN WISCONS
GLACIAL ADVANCE
-ILLINOIAN TILL-



LANDFORMS

MORAINE

FRONT EDGE OF MORAINE

SOURCES: ILLINOIS STATE GEOLOGICAL SURVEY MAP. WOODFORDIAN MORAINES OF ILLINOIS. PLATE 1 OF BULLETIN 94.

SHELBYVILLE AREA GEOLOGICAL SCIENCE FIELD TRIP. GUIDE LEAFLET 1965 E.

deposited by the retreating Wisconsinan glacier when its ice front was stationary for a short period. It forms a broad, gently sloping ridge of low local relief. Both the Kaskaskia and its tributary, the West Okaw, cut across it.

In contrast, the Springfield Plain south of the Shelbyville Moraine, is covered by Illinoian glacial till that has been exposed for about 200,000 years (Wilson, et al., 1965). The glacial material is thinner; the drainage system is older and better integrated; and the river valleys are wider and deeper. Because it has been dissected by streams, the land surface is slightly rolling and better drained (Wilson, et al., 1965).

Land Forms. A northwest-southeast trending ridge running from Dollville to the head of Polecat Creek in the southwest part of Shelby County provides an example of eroded Illinoian morainal drift (MacClintock, 1929). Along the ridge top, sorted sand and gravel outwash deposits are mixed with till, forming saddles, conical hills and drained depressions (Wilson, et al., 1965).

North of the moraine, the Kaskaskia and its tributaries are low gradient meandering streams with shallow valleys. Drainage areas are separated from one another by broad tabular divides. Where the Kaskaskia cuts the moraine, its valley becomes steeper, deeper and narrower. South of the moraine, the river valley widens, and the Kaskaskia is joined by numerous, well-incised tributaries that also have well-developed floodplains. The upland divides between the streams are slightly rolling and narrower because they are more eroded.

Topography

The following parts of the two-county area may be considered as topographic units:

The Shelbyville and Cerro Gordo Moraines. The topography of the Shelbyville Moraine, formed by the Wisconsinan glacier, is somewhat rolling, but not rough. The moraine is broad and low, with a maximum local relief of about 80 feet, and its slopes are gentle. (See Plate II-2.) This is because the silty and clayey Wisconsinan tills that form the moraine are fine grained and have low repose angles (Wilson, et al., 1965). The Cerro Gordo Moraine runs north of, and roughly parallel to, the Shelbyville Moraine. Its topographic expression is even more subdued and the local relief of this broad, gently sloping, flat-topped ridge is seldom over 20 feet. (See Plate II-2.)

The Lake Shelbyville Shore Line. Because the Kaskaskia River cuts rather deeply into the Wisconsinan till, Lake Shelbyville's shore line displays rough topography, providing an interesting contrast to the Illinois prairie. (See Plate II-3.) The long narrow lake covers the Kaskaskia and West Okaw floodplains above the Shelbyville Moraine, and backs into small tributaries, forming coves and arms. The land rises abruptly 40 to 60 feet above the normal pool level (599.7 feet msl) and slopes of 20 percent or more are common along the lake shore. (See Plate II-4.) Because of the silty, clayey, fine-grained character of the area's glacial till, some

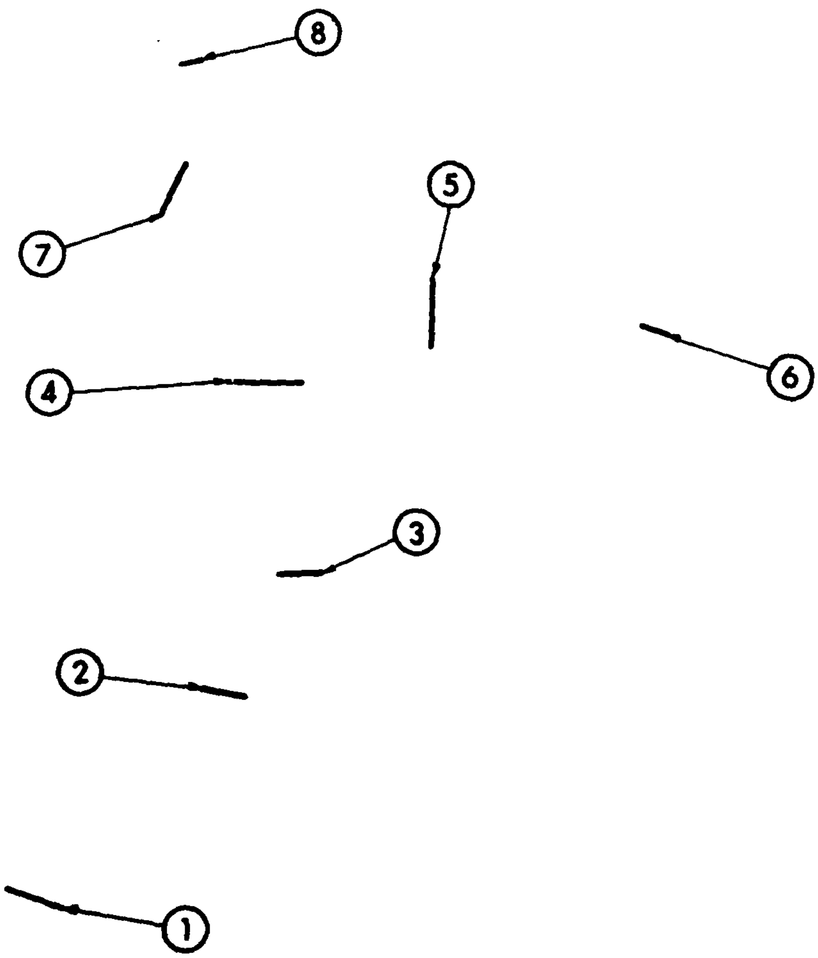
GROUND ELEVATION ABOVE MEAN SEA LEVEL

LEGEND

- 800' +
- 750' - 800'
- 700' - 750'
- 650' - 700'
- 600' - 650'
- 550' - 600'
- 500' - 550'

SOURCE:
UNITED STATES GEOLOGIC
SURVEY MAP

PLATE II-2


8
7
5
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6
3
2
1

LAKE CROSS-SECTIONS

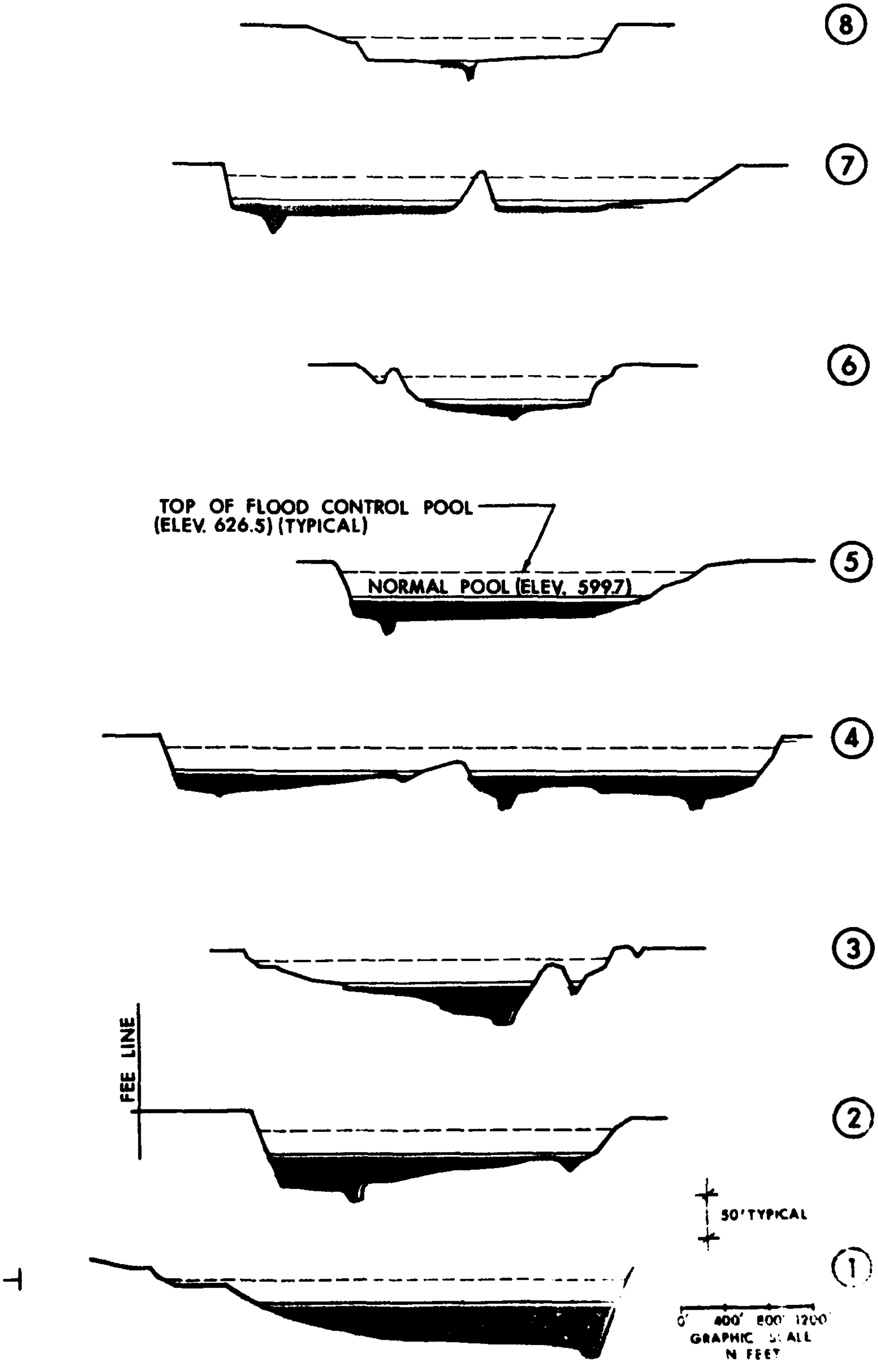
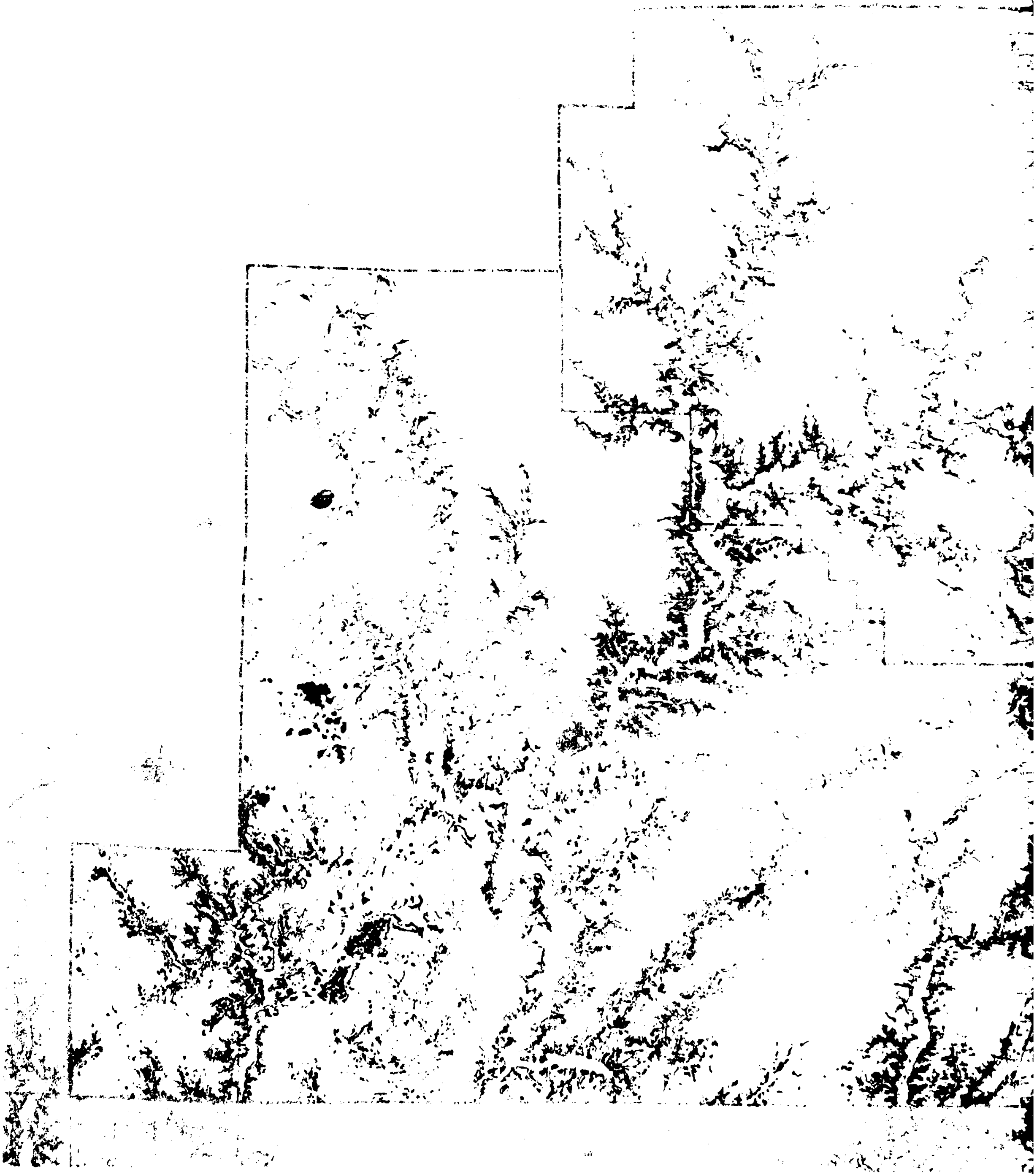
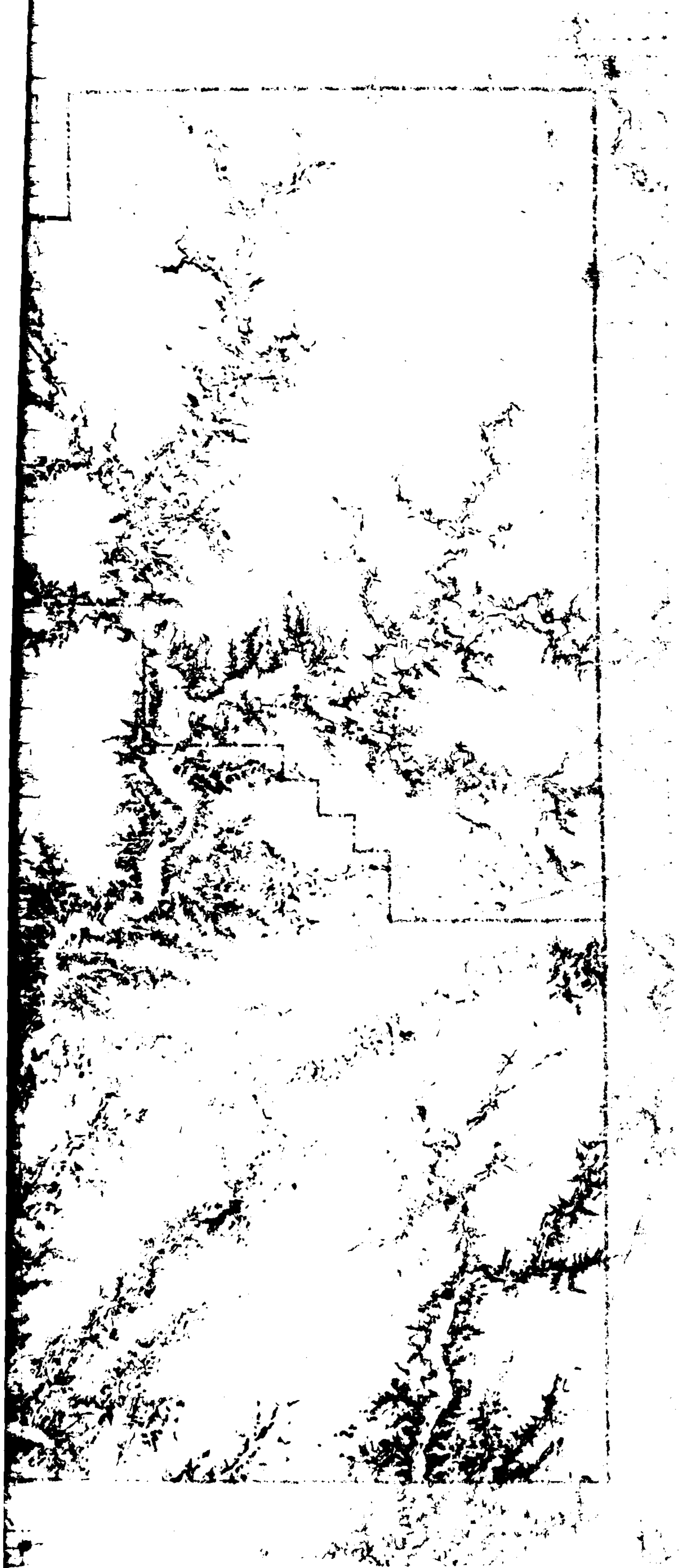


PLATE II-3

2





LAND SLOPES

20% OR MORE
6 - 9%
0 - 5%

SOURCE UNITED STATES GEOLOGIC SURVEY MAP

PLATE II-4

steep banks are subject to erosion and slump. Along the lake's upper reaches, slopes of six to 19 percent are more usual, and the shoreline blends gently into the surrounding farmland, particularly in the wildlife management areas. (See Plate II-3.)

The Uplands North of the Shelbyville Moraine. As discussed in the preceding section, Physiography and Geomorphology, the northern third of Shelby County and all of Moultrie County are covered by approximately 25 to 35 feet of Wisconsinan till, which presents no striking topographic features. The scattered, poorly established streams are separated by wide divides that have less than five percent slope. (See Plate II-4.) Except along the larger streams, local relief is less than 20 feet.

The Kaskaskia River South of the Shelbyville Moraine. South of the moraine, the character of the Kaskaskia and its tributaries changes. The Kaskaskia meanders across a fairly broad floodplain which contains both alluvial river terraces and glacial valley train deposits of sorted sand and gravel (Gardner, 1969). The tributary streams are rather deeply incised into the Illinoian glacial till, and slopes immediately adjacent to these streams often exceed 20 percent. (See Plate II-4.)

Uplands South of the Shelbyville Moraine. This area is more interesting topographically. Its surface was formed by older Illinoian glaciation, and, although it was originally a flat plain, stream erosion has left it slightly rolling. The maximum elevation is about 810 feet at Williamsburg Hill, and the lowest elevations of about 520 feet occur on the Kaskaskia River floodplain, south-south-central Shelby County, in the vicinity of Cowden. (See Plate II-2.) Williamsburg Hill is a conical feature rising about 200 feet above the level of the surrounding plain (Wilson, 1965), and the highest of a group of mounds superimposed on a northwest-southeast trending eroded morainal ridge which occupies the southwest corner of Shelby County. The upland divides are narrower than those north of the moraine because drainage patterns are better established.

Historical Geology

The historical geology significant to the Lake Shelbyville area is related to two geologic eras, the Paleozoic and the Cenozoic. (See Table II-1.) Paleozoic deposition began about 325 million years ago, while the younger Cenozoic sediments range in age from two to three million years to the present.

Pennsylvanian limestone, sandstone, shales and coals from the Paleozoic era underlie the dam site and Lake Shelbyville area. These consist of alternating layers of sandstone, shale, limestone and coal beneath the more recent Pleistocene materials and outcrop along the edges of the Kaskaskia River Valley. These sediments are the geologically sound and impermeable base upon which the dam is built.

The Pleistocene deposits from the Cenozoic era consist of the unconsolidated glacial tills, windblown silts or loess, and intermingled sandy and gravelly outwash deposits. These several types of deposits surround Lake

Table II-1

GEOLOGIC TIMETABLE FOR SEDIMENTS IN STUDY AREA WITH ERA AND SYSTEM NAMES (Gilluly, 1968)

Era	System (Period)		Approx. age - Millions of Yrs. (Beg. of Unit)
Cenozoic	Quarternary		2.0 - 3.0
	Tertiary		
(Mesozoic)	Cretaceous	Sediments not present in study area.	
	Jurassic		
	Triassic		
	Permian		
Paleozoic	Pennsylvanian		325
	Mississippian		350
	Devonian		400
	Silurian		440
	Ordovician		500
	Cambrian		550 - 600
Precambrian			3500 or more

Shelbyville and are found along the water's edge. The older Illinoian glaciation deposited 10 to 20 feet of medium-textured glacial till directly on the Pennsylvanian deposits. The later Wisconsinan glaciation deposited 25 to 35 feet of medium-textured glacial till on top of the Illinoian till. Between these deposits, and covering the Illinoian glacial till, a clayey soil was formed during the interglacial periods.

An ancestral pre-glacial valley cut into the underlying Pennsylvanian bedrock occurs northwest of the dam site and proceeds west of Shelbyville. During glaciation, the valley was filled with various materials, among which were permeable sands and gravels. Because of their permeability, such deposits might constitute a lake seepage hazard. However, during dam construction, measures were taken to seal off these porous strata.

Stratigraphy and Lithology

Very ancient (Paleozoic) sediments and very recent (Cenozoic) sediments are the two major deposits in the area and are illustrated in the stratigraphic column. (See Plate II-5.) The Mississippian System of the Paleozoic has most of the limited oil in Shelby and Moultrie Counties, but does not affect the area of the lake. The Pennsylvanian System, later in the Paleozoic, has all the minable coal in both counties, including the strippable "Shelbyville Coal" in the lake area.

The ice age, or Pleistocene Series of the Cenozoic Era, deposited the unconsolidated glacial material that underlies the lake. The major impact of the lake on these glacial deposits is erosion, particularly bank erosion, and possible transmittance of water through these sediments.

Structural Geology

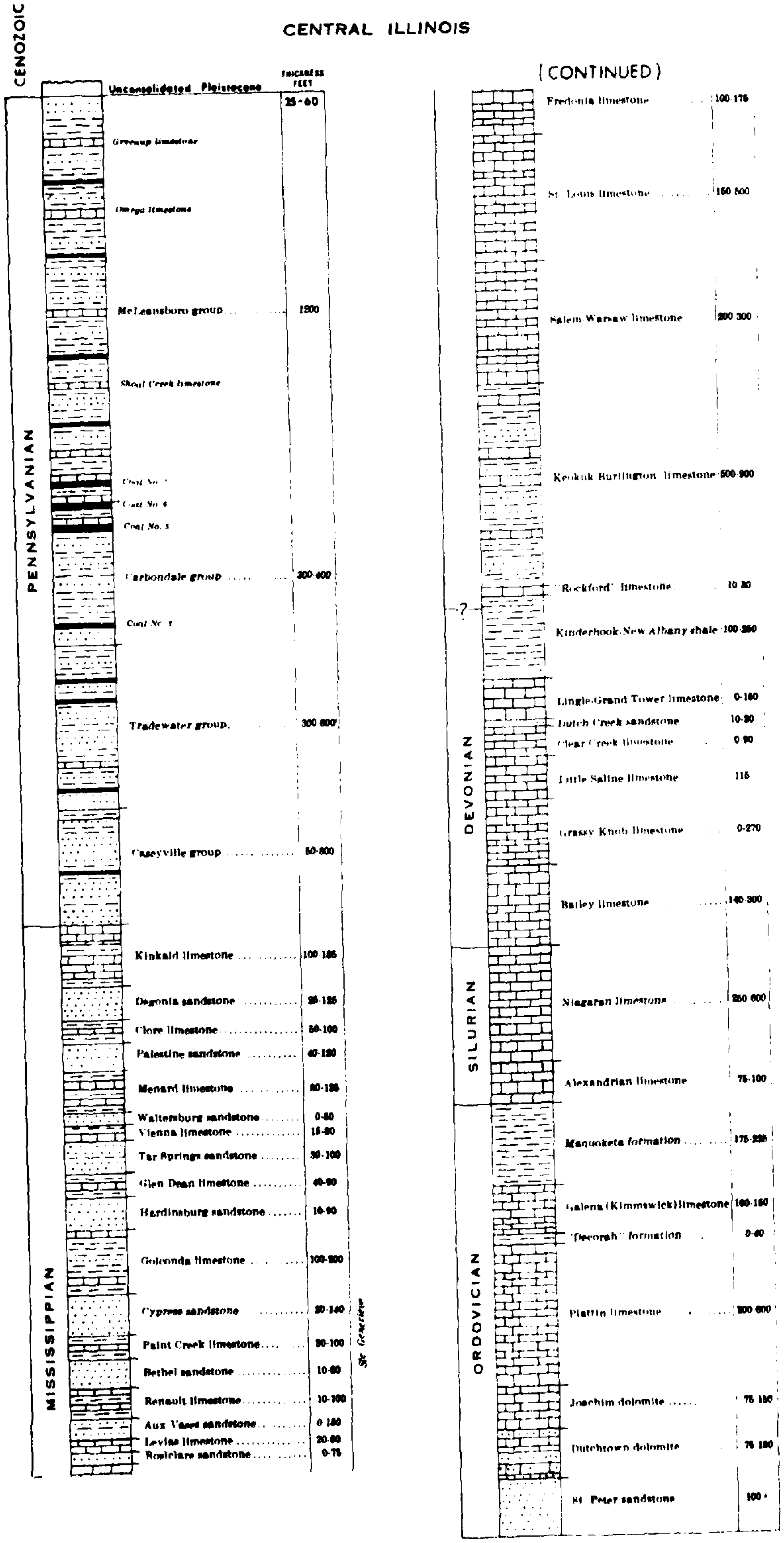
Lake Shelbyville lies on the northwest margin of the deeper portion of the Illinois Basin. Throughout the Paleozoic era to the present time, the area around Lake Shelbyville has been relatively free from stress or strain of the rock units. This has resulted in very homogeneous rock layers with little fracturing, faulting or doming of the deposits. The major favorable impact of structural geology upon the lake is the general lack of features which might hinder storage of water.

Economic Geology

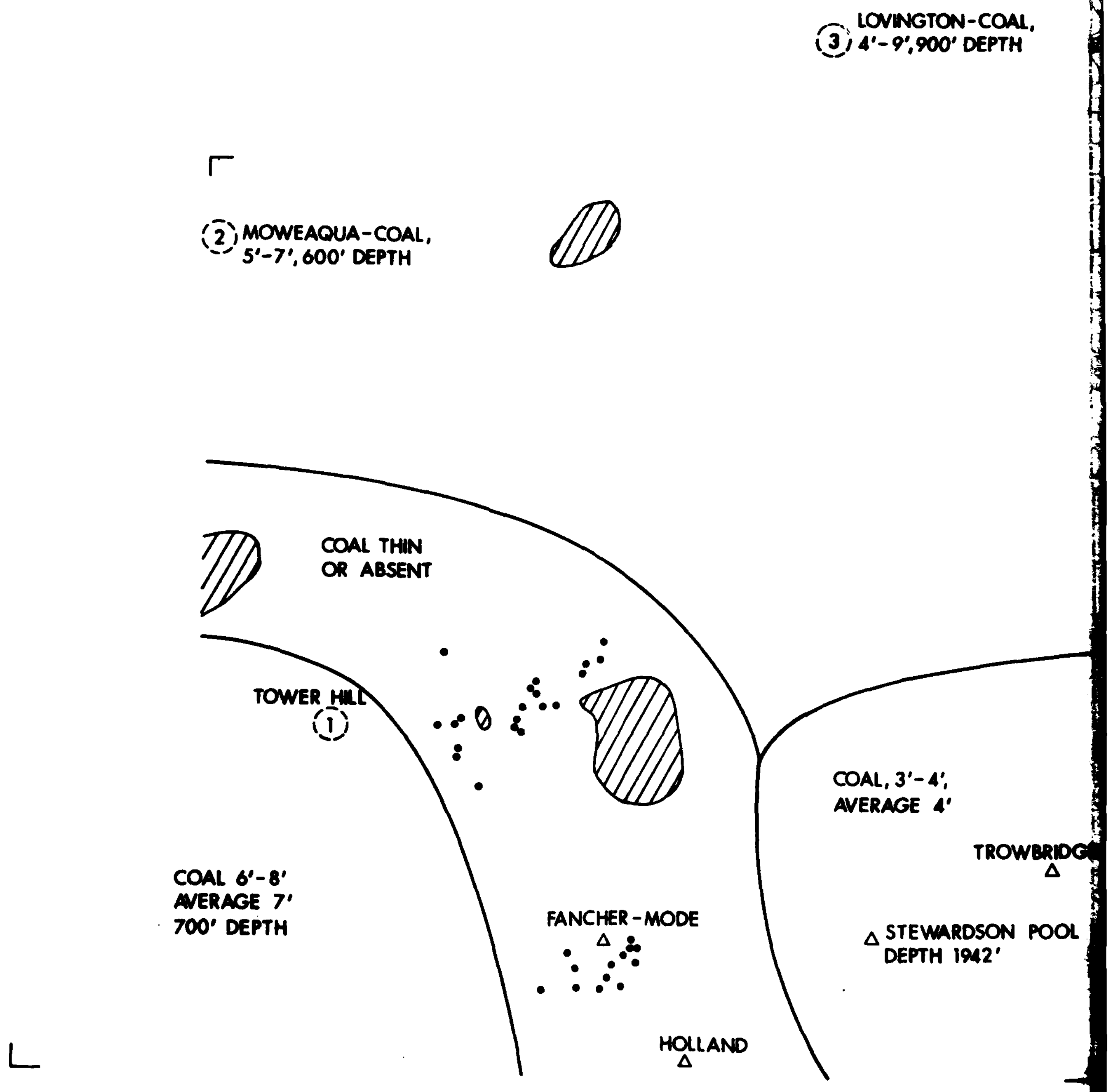
Coal. Most of the present deep coal mining in Shelby and Moultrie Counties is of no importance to Lake Shelbyville. All the reserves in Moultrie County are mined from deep coal seams in the Pennsylvanian strata. These reserves are near the town of Lovington. Although information is scanty, the deep coal is probably thin in the immediate vicinity of the lake, and, therefore, uneconomical to mine. Of the reserves in Shelby County, some are affected by the lake. (See Plate II-6.) Some strippable coal is present in the Kaskaskia Valley, and the location of the lake has some impact on strippable coal.

STRATIGRAPHIC COLUMN

CENTRAL ILLINOIS



LAKE SHELBYVILLE, ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
ON
OPERATION AND MAINTENANCE



LOVINGTON-COAL,
3
4'-9',900' DEPTH
2
MOWEAQUA-COAL,
5'-7',600' DEPTH
COAL THIN
OR ABSENT
TOWER HILL
1
COAL, 3'-4',
AVERAGE 4'
TROWBRIDGE
COAL 6'-8'
AVERAGE 7'
700' DEPTH
FANCHER-MODE
STEWARDSON POOL
DEPTH 1942'
HOLLAND

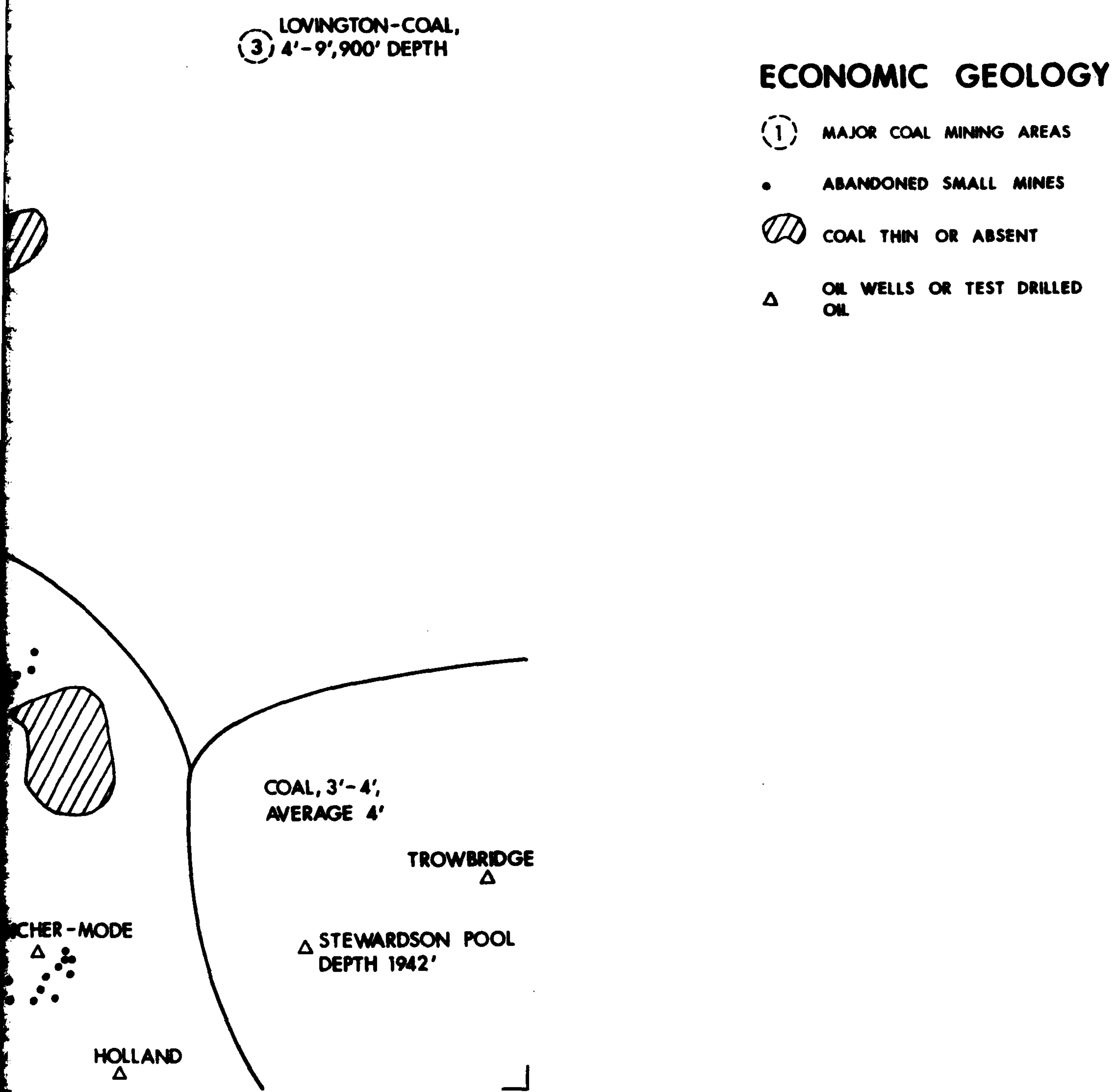

LOVINGTON-COAL,
3 4'-9',900' DEPTH
ECONOMIC GEOLOGY
1 MAJOR COAL MINING AREAS
ABANDONED SMALL MINES
COAL THIN OR ABSENT
OIL WELLS OR TEST DRILLED OIL
COAL, 3'-4',
AVERAGE 4'
TROWBRIDGE
-CHER-MODE
STEWARDSON POOL
DEPTH 1942'
HOLLAND

PLATE II-6

"Of the 84.5 million tons of strippable reserves in Shelby County, approximately 68.5 million tons are from the Shelbyville Coal, which averages about two feet in thickness and lies at strippable depth in the vicinity of Shelbyville. However, only 5,160,960 tons of the Shelbyville Coal were excluded due to being overlain by Lake Shelbyville. These reserves occur in about the lower two miles of the lake."* There is no known method of extracting the strippable coal, while it is overlain by water.

Oil. Minor oil reserves are present in the Mississipian strata in Shelby County. However, these reserves are not near Lake Shelbyville. (See Plate II-6.)

Groundwater Geology

Sand and gravel deposits in the Lake Shelbyville area are the most important aquifers, or geologic deposits, that transmit water, along the courses of streams, in the fill of buried valleys, and where the glacial drift is thick. Most of Shelby and Moultrie Counties' domestic, farm and municipal water comes from these deposits. Downward seepage of precipitation through the drift serves as their principal source of recharge on an areawide basis. However, aquifers occasionally intersect streams or standing water bodies such as Lake Shelbyville. Then the aquifer may be recharged directly by surface water, particularly during floods. It is possible that the aquifers could be contaminated by surface waters.

A system of 15 perimeter piezometers (11 above the dam and 4 below) has been installed and observed since 1965 to study the relationship between the lake and ground water levels. These piezometers indicate, with two exceptions (pp-7 and pp-11), that ground water in the pool perimeter area remains above the lake level; thus, the direction of ground water flow is toward the lake.

The source of this ground water is precipitation on surrounding uplands percolating into the glacial drift deposits. The directional flow of ground water from the uplands into the lake precludes contamination of the aquifer by the lake. An exception to this flow pattern may occur temporarily if the lake suddenly rises and induces flow into adjacent portions of the aquifer. However, since most lake rises are associated with heavy precipitation, the ground water similarly rises and the flow pattern is restored.

Piezometers pp-7 and pp-11 are installed in a deep buried glacial channel which runs east of the City of Findlay, under the lake, then southwest under the City of Shelbyville, and finally rejoins the present Kaskaskia valley near the juncture with Robinson Creek. The Cities of Shelbyville and Findlay utilize wells drilled into this channel for their municipal water supply. The lake has apparently had little effect on ground water in this

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* Nance, Roger B., February 11, 1974. Information in a letter from Mr. Nance to B. Neilson.

channel, and piezometric levels indicated by pp-7 and pp-11 have actually dropped since construction of the lake. This drop may be due to siltation of the aquifer and/or withdrawals for water supply.

Should lake water enter the ground water system from either of the above circumstances, the glacial sands and gravels comprising the aquifer (unlike fractured rock aquifers) provide excellent filtration for suspended solids and bacteria.

To summarize the data on ground water, a water supply study from various wells is valuable for both quality and quantity. The only available data is that before the lake existed. (See Table II-2.) Pumping from the area's wells is insufficient to cause major drawdowns.

According to piezometer data from 1966 through 1972, ground water levels rose slightly both above and below the dam. The rise was considered normal. However, farther downstream, in the vicinity of Cowden, discharges from Lake Shelbyville substantially - though transiently - raise the water tables of the bottomland along the Kaskaskia River. The affected agricultural land is damp and/or saturated when the Kaskaskia is elevated by sustained release from the dam.

Aesthetic Earth Resources

Relatively abrupt gorge-like timbered slopes border the Kaskaskia River Valley at the site of Lake Shelbyville. This broken terrain stands in marked contrast to the surrounding flat Illinois farmland and, thus, constitutues an aesthetic earth resource. There are no others in the area.

Pedology

General

Soils of the area are formed on the nearly level Wisconsinan drift plain and the hilly Shelbyville morainic system. One and one-half to six feet of windblown silt (loess) overlies the medium textured glacial till. The area is characterized by nearly level to gently sloping uplands with steep slopes adjacent to the narrow drainageways and rivers. It is sparsely dissected by streams. Active stream bank cutting and gully formation occur in the upper reaches of stream valleys.

Properties of the Till

All glacial till deposits are medium-textured, with some (1-5 percent) small stones, and they extend to the Pennsylvanian bedrock. North of the Shelbyville Moraine, the Wisconsinan glacial till is 25 to 35 feet deep and covers the older Illinoian glacial till which has similar physical properties. When exposed on side hills and stream and lake banks, the till is light colored and highly erosive. It has a high shear strength when dense; however, in its natural state, it loses cohesion quickly upon saturation. The steep slopes near the major drainageways are relatively stable under vegetated

Table II-2

TOTAL CITY WATER SUPPLY AS OF 1961

Town	Well No.	Ground Eleva-tion	Total Depth	Pumping Rate	Hard-ness	Dis-solved Minerals	Iron	Methane Gas
Shelbyville	1	557'	59' 10"	500 gpm	23.5 gr/gal	476 ppm	trace	
	2		57' 10"	500 gpm				
	3		56' 8"	500 gpm	27.8 gr/gal	508 ppm	0.1 ppm	
	Total			500,000 gpd August				
Windsor[1]	1		100' 10"	60 gpm	19.3 gr/gal		5.4 ppm	7.5 cu.ft./ 1,000 gal.
	2	708'	131' 5"	18-20 gpm				
	3	720'	99' 9"	40 gpm	20.0 gr/gal	446 ppm	6 ppm	
	4		99' 9"					
	Total			91,800 gpd August				
Findlay[2]		154' 0"		150 gpm	15.3 gr/gal		4.8 ppm	8.1 cu.ft./ 1,000 gal.
Maximum Allowable [3]						500 ppm	0.3 ppm	

Soft = Less than 2.93 grains per gallon
Hard = Less than 5.86 grains per gallon to 8.80 grains per gallon

(1)
Hanson, Ross, 1961, Additions to Public Groundwater Supplies in Illinois, Illinois State Water Survey, Bulletin 40, Supplement II, Urbana.

(2)
Hanson, Ross, 1950, Illinois State Water Supply, Illinois State Water Survey, Bulletin 40, Urbana.

(3)
Fair, G.M. and J.C. Geyer, 1954, Water Supply and Waste Water Disposal, John Wiley and Sons, New York. 973 Pages (P.626).

conditions, but quickly become unstable when vegetation is removed or when the presence of ground water reduces the shear strength. It is this condition, together with wave action, that contributed to the slides on steep slopes along the edges of Lake Shelbyville. Three to four feet beneath the surface, the till becomes compact. This decreases its permeability to a moderately slow to slow rating (.06-.63 in./hr.). Although water does move through the till, it does so slowly and, thus, the till acts substantially as a barrier to ground water movement.

Properties of the Soil

The Birkbeck, Flanagan, Ward and Reeseville soils are present on the level to gently sloping uplands. The Birkbeck soils are formed in three to five feet of loess and are well to moderately well-drained. They occur on gently and moderately sloping areas and are subject to damaging erosion. The Flanagan, Ward and Reeseville soils are somewhat poorly to poorly-drained and occur on nearly level to level areas on the uplands. These soils are not subject to erosion. They require tile drainage because high ground water levels during much of the year hamper effective cultivation. This high ground water table is also a hindrance for housing developments and corrective measures must be taken. All the above soils, when drained, are highly productive and respond well to fertilizer additions. Drummer Silty Clay Loam is another soil found on upland areas. It is dark black surface soil with a dark gray mottled subsoil. Since it is poorly-drained, it has a high water table unless tiled. When well drained, this soil can be highly productive and will respond well to fertilizer additions.

The Strawn, Russell and Hennepin soils occur on upland areas and steep slopes along major drainageways. These light colored, thin surfaced soils are subject to severe erosion when not adequately protected. The effect of erosion is serious for these soils because they are thin, and the underlying glacial till is quickly exposed. They are well-drained and do not require artificial drainage. They are productive, but require large additions of fertilizer to obtain high yields, and are frequently too steep to allow cultivation.

The Lawson, Sawmill, Coffeen, Wakeland and other soils occur on the level to slightly undulating floodplain below the dam, and their drainage is primarily governed by the position they occupy relative to the ground water level. Tile drainage is effective in all these soils and the limiting factor is the placement of the tile outlet so that the water can drain. Water release from Lake Shelbyville plays an important role in controlling ground water levels in these soils.

Climatological Elements

Because the upper Kaskaskia drainage basin is located near the center of North America, it has a typical continental climate. The summers are warm and rather humid; the winters are fairly cold; and the weather changes quickly.

Temperature

The area's average monthly temperatures range from the upper twenties in January to the upper seventies in July - an average seasonal range of about 50 degrees. Temperatures of 70 degrees or higher may occur during the winter months, and lows of 50 degrees are sometimes recorded in the summer (U. S. Department of Commerce, 1972).

In general, the summers are warm and the winters are fairly cold. The temperature exceeds 90 degrees about 29 days annually, but only occasionally reaches 100 degrees. Below zero winter readings occur on about nine days a year and the temperature drops to freezing, or below, on 122 days. Absolute maximum and minimum temperatures recorded at the Springfield weather station, one of the oldest in the area, show a spread of 136 degrees. The record high was 112 degrees in July, 1954, and the low was -24 degrees in January, 1905.

In Shelby and Moultrie Counties, the last spring freeze occurs around April 25th, and the average date of the first fall freeze is October 20th. The growing season, or number of days between the last spring and the first fall freeze, is about 180 days. The early and late freezes are generally radiational, occurring when the skies are clear and the winds are light, rather than as a result of cold air brought in by large storm systems (Illinois Department of Agriculture, 1973).

Precipitation

Variability and unpredictability are the most important characteristics of precipitation in the upper Kaskaskia drainage basin, and they substantially affect Lake Shelbyville pool level regulation. The 37-year record from seven gaging stations above Shelbyville shows an average annual precipitation of 38.5[illegible] inches, but it may vary considerably from year to year. For example, the lowest annual total over the 37 year recording period was 27.13 inches, and the highest was 56.29 inches (U. S. Army Engineer District, St. Louis, 1964). Like the annual totals, monthly precipitation varies. During May, the upper drainage basin has had as much as 10.55 inches of rain, and as little as 0.67 inches. February precipitation has ranged from 4.58 inches down to 0.16 inches (U. S. Army Engineer District, St. Louis, 1964). Other months show similar absolute ranges.

Even more striking departures from the average are reflected in the monthly figures from the precipitation gage that was installed at the Shelbyville dam site in May, 1973; 0.10 inch of precipitation fell in January, 1964, whereas 4.18 inches fell in January, 1969; August, 1971 was a very dry month, with only 0.08 inch of precipitation, but 5.62 inches of rain fell in August, 1972. (These data are from a single station, whereas the maximum, minimum and average rainfall for the upper basin represents weighted values from seven stations).

When such monthly figures are averaged over a period of years, the extremes tend to even out, so that December and February are generally the driest months, with an average precipitation of slightly over two

inches. May and June, when an average of more than four inches falls, are usually the wettest. In the 36 months of 1970 through 1973, rainfall approximated "normal" in only four months, and pool level regulation must be in response to the extremes. Most of the summer moisture comes from localized showers and thunderstorms which may be brief and heavy (Illinois Department of Agriculture, 1973), accounting for some of the rainfall variation.

About 20 inches of snow falls annually in the upper Kaskaskia basin, but it usually melts rapidly, disappearing in a few days (U. S. Department of Commerce). Although it is rare, snow can fall as late as May and as early as October.

Cloud Cover and Fog

Storm systems move through the area most frequently during the winter and spring months, causing maximum cloudiness during these seasons. December, January and March average 18, 17 and 17 days of full cloud cover, respectively, making them the gloomiest months (U. S. Department of Commerce, 1972). The summer months, on the other hand, are sunny. June, July and August average more than 70 percent of possible sunshine (Illinois Department of Agriculture, 1973).

According to the weather summary of Springfield, the nearest station that records such data, the region can expect about 17 days of heavy fog each year. Except for June, all months have at least one foggy day, and December, January and February average three days each, making winter the foggiest season.

Relative Humidity

Relative humidity is recorded at the Springfield weather station. Average relative humidity is 73 percent during the winter and 69 percent during the summer recreational season. Because relative humidity is high throughout the year, averaging 71 percent, temperature extremes (whether summer highs or winter lows) are uncomfortable.

Severe Weather

Hail sometimes falls during summer thunderstorms, and most localities will experience it several times a year. However, not all hail storms have stones of sufficient size and quantity to cause damage. Tornadoes and high winds occasionally accompany thunderstorms. Such severe weather is usually limited to small areas, but damage from it may be great (U. S. Department of Commerce, 1972).

The effect of freezing rain and sleet, once they have fallen, is much the same, although the climatologic conditions responsible for them are different. The Shelbyville station has recorded these forms of severe weather in late fall, winter and early spring. The area averaged four days of freezing rain and/or sleet annually, but it varied greatly from year to year. For example, while no freezing rain or sleet fell at the

Shelbyville station in 1965, 14 days of it was recorded in 1972 (U. S. Army Engineer District, St. Louis, 1974).

Wind and Wind Fetch Study

March is the windiest month, with a mean wind speed of 14.2 mph, and August, when the mean is 8.0 mph, is the calmest. During January, February and March, when regional storm systems are common, the prevailing wind direction is northwest. For the rest of the year, the wind blows from the south or south-southwest. Maximum speeds registered at the Springfield station have been as high as 75 mph, and all months have had occasional winds well over 40 mph (U. S. Department of Commerce, 1973).

A total of eight fetch lengths equalling 2 km or over were selected (see Plate II-7) to obtain representative wave heights along different sections of the lake. (See Appendix D for details.)

Air Quality

Because it is an area of farms and small towns, the upper Kaskaskia drainage basin does not have air pollution problems associated with automobile exhaust fumes and heavy manufacturing, common in very large urban areas.

A possible source of air pollution is the Crest Container Corporation's new polystyrene container manufacturing plant at Shelbyville, which has just been granted a variance, allowing it to burn high sulfur coal for one year (State of Illinois, 1974).

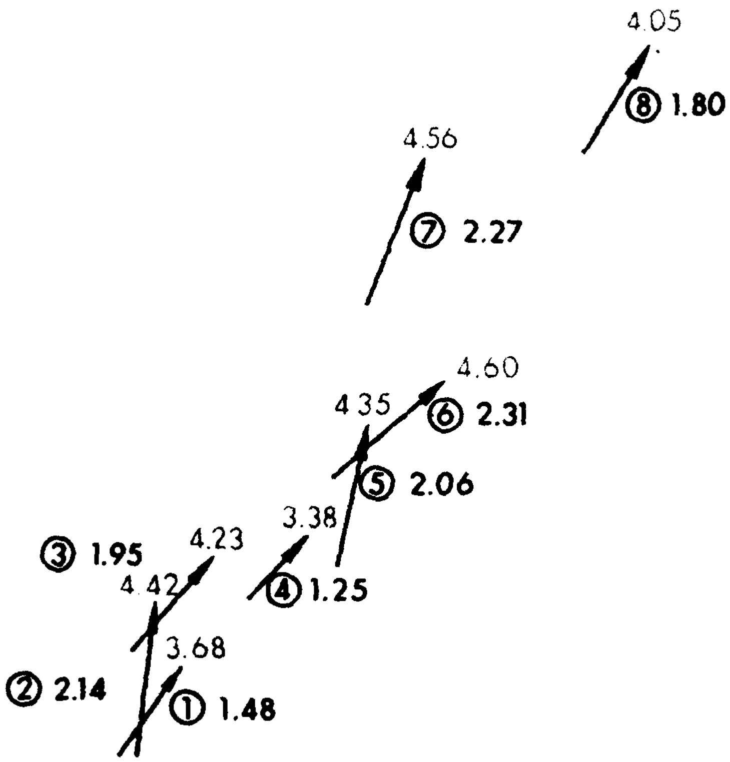
When the dam was first opened, some Shelbyville residents complained of noxious odors coming from the vicinity of the dam site during the summer and affecting some residences close to the dam site. The odor was hydrogen sulfide, presumably coming from decaying trees and other vegetation left standing behind the dam and submerged when the pool was filled. This odor has decreased considerably during the past two years and should not present any major difficulty in the future.

Hydrological Elements

Existing Surface Water Resources

General. The Kaskaskia River basin above the Shelbyville dam site has a median length of 103 miles, an extreme width of 35 miles, an average width of 20 miles, and an area of 1,030 square miles. The area of the entire Kaskaskia basin above its junction with the Mississippi River is 5,840 square miles. The average channel slope of the Kaskaskia River in the 103 miles above the dam site is 1.65 feet per mile. (See Plate II-8.)

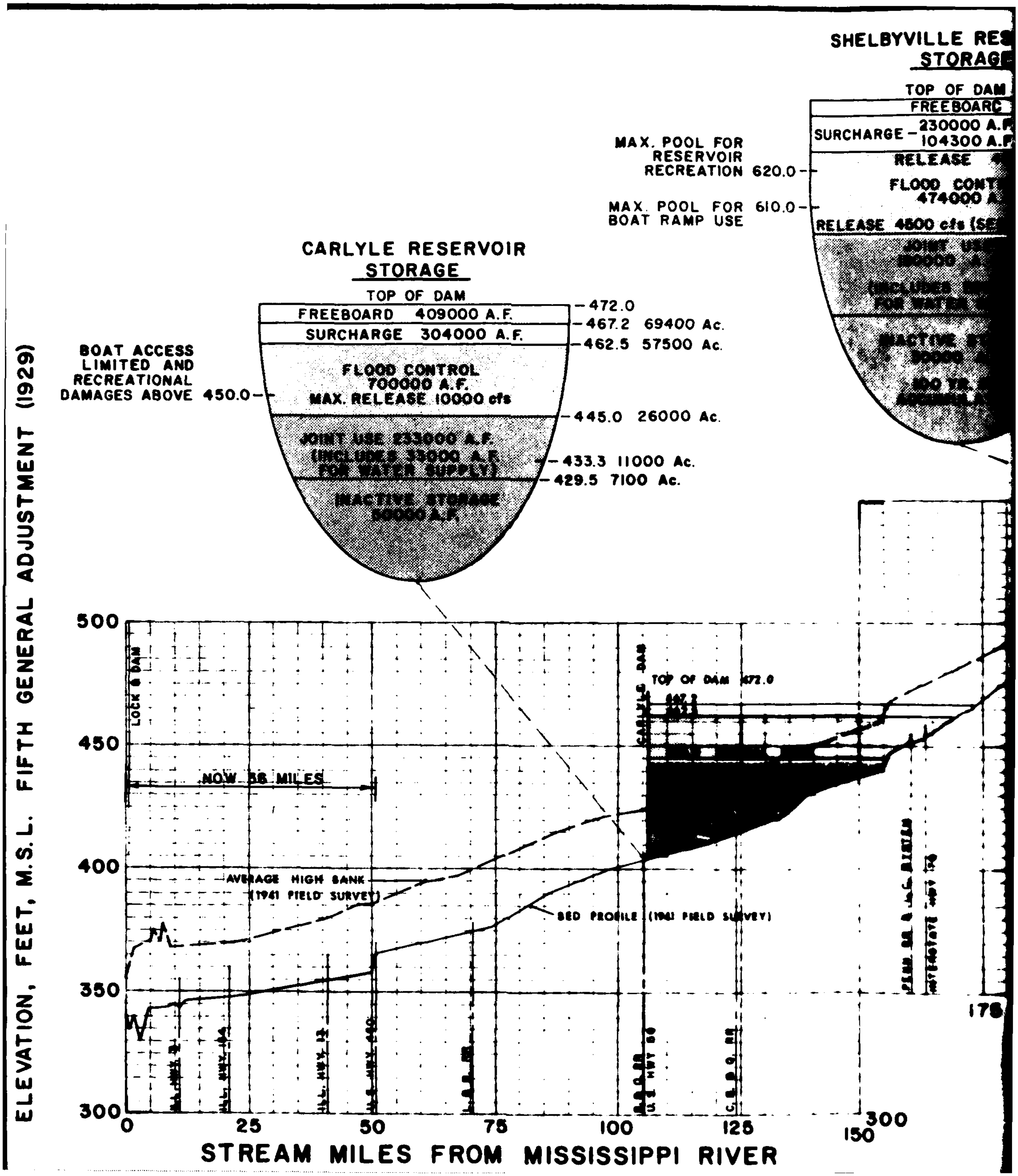
Four streams with drainage areas of more than 50 square miles are tributary to the Kaskaskia River in Shelby and Moultrie Counties. (See

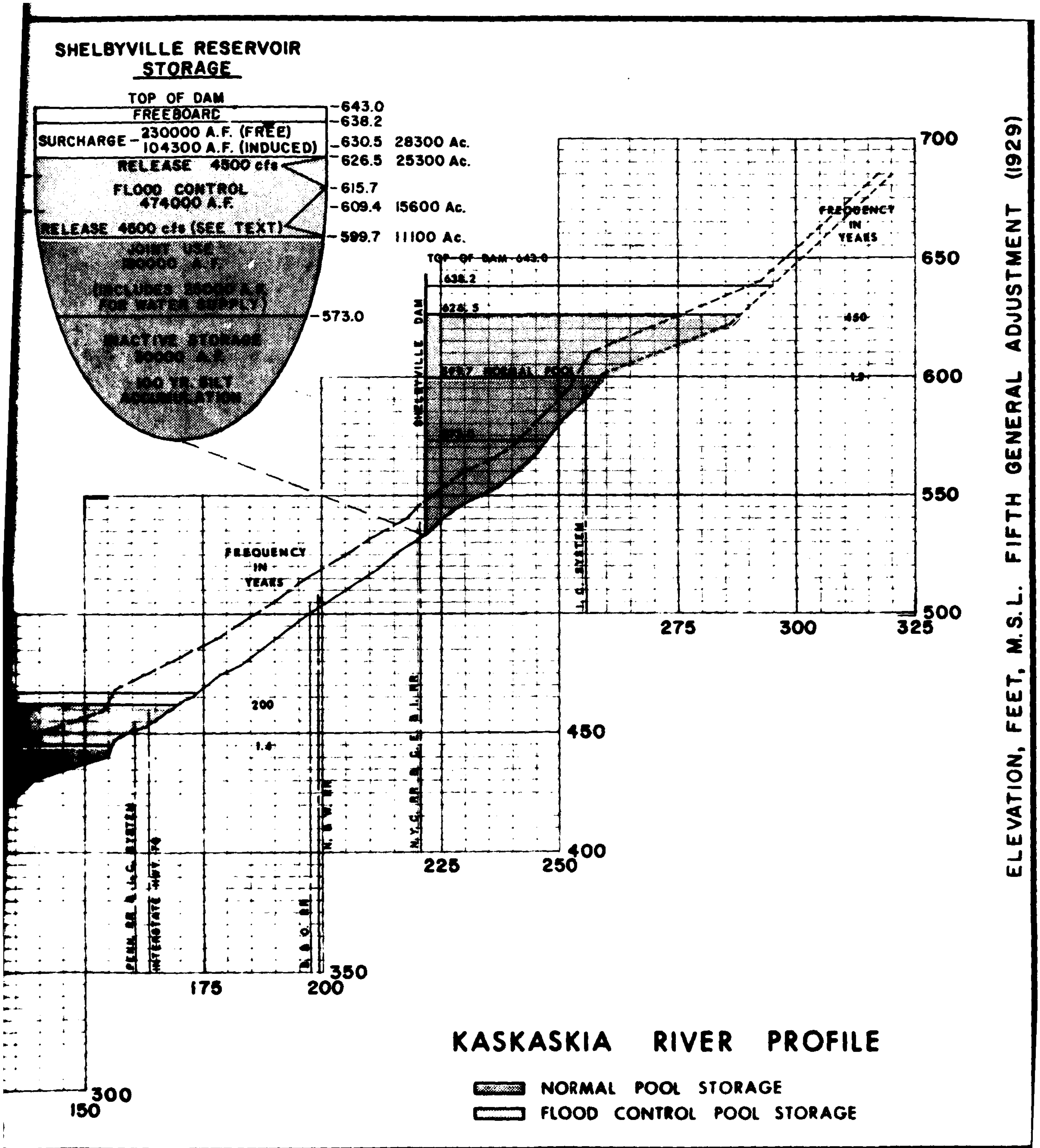

4.05
⑧ 1.80
4.56
⑦ 2.27
4.60
4.35
⑥ 2.31
⑤ 2.06
3.38
④ 1.25
③ 1.95
4.23
4.42
3.68
② 2.14
① 1.48

WIND WAVE HEIGHTS

(3) FETCH LOCATION
1.95 FETCH LENGTH IN MILES
3.38 WAVE HEIGHT IN FEET

2


SHELBYVILLE RES
STORAGE
TOP OF DAM
FREEBOARD
SURCHARGE - 230000 A.F. 104300 A.F.
RELEASE
FLOOD CONT
474000 A.
MAX. POOL FOR RESERVOIR RECREATION 620.0
MAX. POOL FOR BOAT RAMP USE 610.0
RELEASE 4800 cfs
CARLYLE RESERVOIR
STORAGE
TOP OF DAM
FREEBOARD 409000 A.F.
SURCHARGE 304000 A.F.
FLOOD CONTROL
700000 A.F.
MAX. RELEASE 10000 cfs
JOINT USE 233000 A.F.
(INCLUDES 33000 A.F. FOR WATER SUPPLY)
INACTIVE STORAGE
50000 A.F.
472.0
467.2 69400 Ac.
462.5 57500 Ac.
445.0 26000 Ac.
433.3 11000 Ac.
429.5 7100 Ac.
BOAT ACCESS LIMITED AND RECREATIONAL DAMAGES ABOVE 450.0
ELEVATION, FEET, M.S.L. FIFTH GENERAL ADJUSTMENT (1929)
500
450
400
350
300
LOCK & DAM
CARLYLE DAM
TOP OF DAM 472.0
NOW 58 MILES
AVERAGE HIGH BANK (1941 FIELD SURVEY)
BED PROFILE (1941 FIELD SURVEY)
0
25
50
75
100
125
150
175
300
STREAM MILES FROM MISSISSIPPI RIVER



SHELBYVILLE RESERVOIR
STORAGE
TOP OF DAM
FREEBOARD
SURCHARGE - 230000 A.F. (FREE)
104300 A.F. (INDUCED)
RELEASE 4500 cfs
FLOOD CONTROL
474000 A.F.
RELEASE 4500 cfs (SEE TEXT)
-643.0
-638.2
-630.5 28300 Ac.
-626.5 25300 Ac.
-615.7
-609.4 15600 Ac.
-599.7 11100 Ac.
-573.0
TOP OF DAM 643.0
638.2
626.5
SHELBYVILLE DAM
FREQUENCY IN YEARS
450
1.5
200
1.4
I. C. SYSTEM
N.Y.C. RR. & C. & E. I. RR.
N. & W. RR.
B. & O. RR.
PENN. RR. & I. C. SYSTEM
INTERSTATE HWY. 70
700
650
600
550
500
450
400
350
300
150
175
200
225
250
275
300
325
ELEVATION, FEET, M.S.L. FIFTH GENERAL ADJUSTMENT (1929)
KASKASKIA RIVER PROFILE
NORMAL POOL STORAGE
FLOOD CONTROL POOL STORAGE

Plate 1, Appendix E.) The largest of these, the West Okaw River, has a 296 square mile drainage area, a length of 33 miles, and an average gradient of 3.2 feet per mile. The steepest of the principal tributaries above Shelbyville, Becks Creek, has a tributary area of 200 square miles, a length of 21 miles, and an average gradient of 7.6 feet per mile.

The Shelbyville terminal moraine has a preceptible effect on existing drainage patterns of the area.

Precipitation. The annual average precipitation, over the basin, is 38.59 inches, ranging between a minimum of 27.13 and a maximum of 56.29 inches. Of the average annual precipitation, about 23 percent falls in May and June. Local cellular storms (thunderstorms) also occur in July and August, with rain storms sometimes frequent in the spring.

Evaporation. Monthly pan and reservoir evaporation is based upon four reasonably long evaporation pan records at several locations around the region. The average annual lake evaporation is almost the same as the average annual rainfall. About two-thirds of this evaporation occurs from May through September, inclusive. If April is added to this, 29.06 inches, or 76+ percent of the average annual evaporation, occurs from the beginning of April to the end of September.

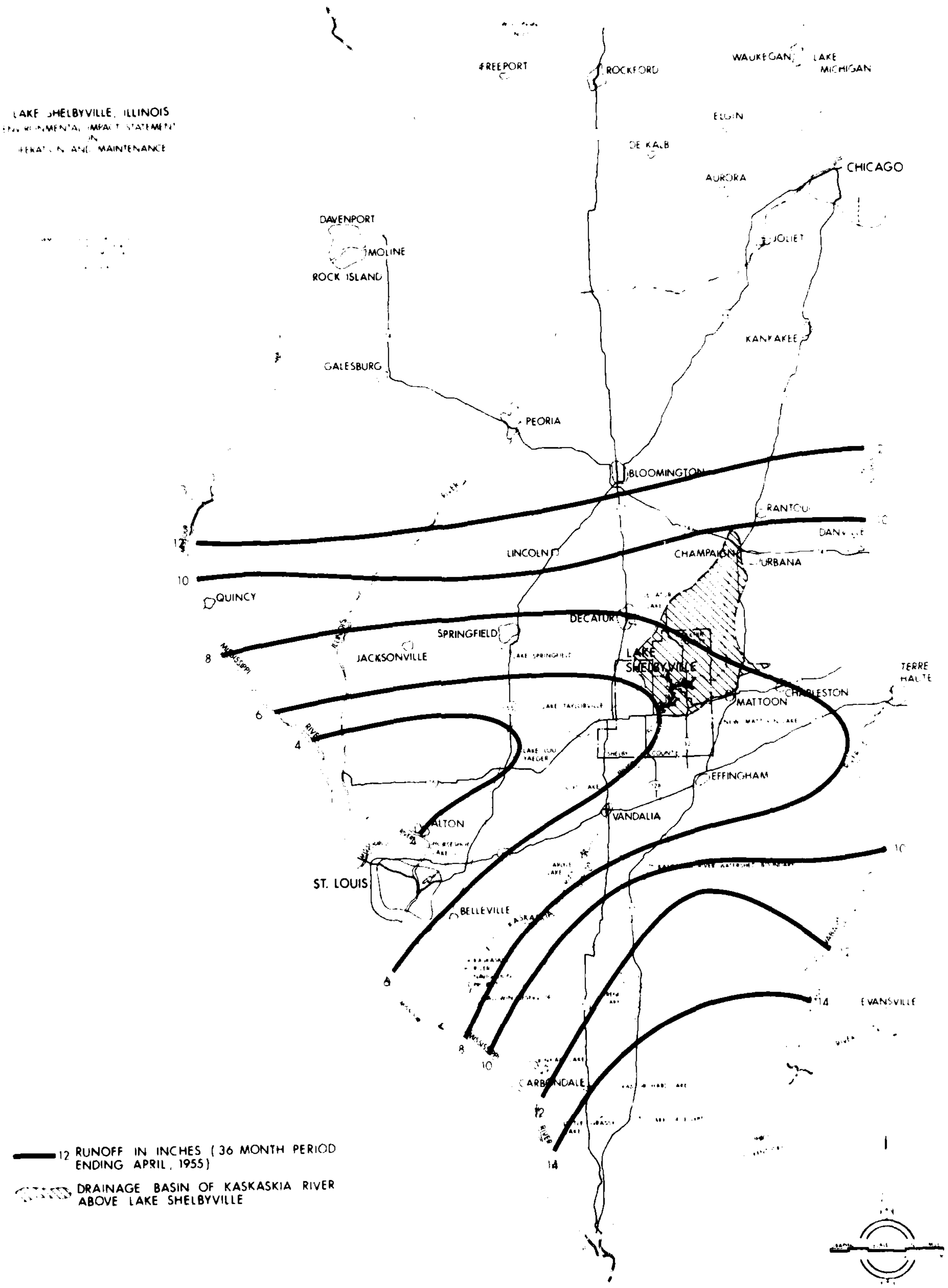
Precipitation Abstractions. In addition to the evaporation abstractions from the precipitation prior to runoff, there are additional abstractions sometimes termed "losses". Studies indicate that the initial precipitation abstructions for large storms over the Kaskaskia River basin vary from 0.30 to 1.00 inch. Additional "losses" from infiltration ranged from 0.04 to 0.08 inch per hour.

Runoff and Stream Flow. The average annual runoff is 10.69 inches, or 28 percent of the average annual rainfall, (see Plate II-9) with the range of monthly averages from 1.66 inches in April to 0.07 inch in September.

The distribution of runoff is such that over 76 percent of it occurs in the first six months of the year (8.20 inches out of 10.69). Each inch of runoff equals almost 55,000 acre-feet of water. The wide variation in annual yield of the watershed surface runoff is emphasized by the great disparity between the minimum monthly flow of 6.88 acre-feet in October as compared to a maximum monthly flow of 440,040 acre-feet in January. The average monthly flow in acre-feet is 49,100. Annual peak stages and discharges at the Shelbyville gage for the period 1941-59 range from an instantaneous peak of 25,900 cfs in 1957, to an annual peak of 662 cfs in 1954.

Maximum Annual Floods at Shelbyville. For the period 1941-59, maximum gage heights indicate that the flows did not exceed bankfull in five of these years.

Major storms are those which had peak discharges in excess of 15,000 cfs. There were six storms between 1941 and 1959 that fall into this category. A storm of May, 1908, and another of August, 1915, also qualify for this listing. The storm with the greatest total runoff was that of



RUNOFF CHARACTERISTICS

PLATE II-9

December, 1949 to March, 1950, when there was a total runoff of 4.25 inches above bankfull from the area above Shelbyville. The peak discharge was 22,000 cfs. The greatest peak discharge storms occurred in June, 1957 and May, 1974, with intense precipitation occurring in the lower part of the Shelbyville watershed resulting in a daily maximum peak flow of 25,900 cfs and 30,C 0 cfs respectively.

<u>Douths.</u> Studies dated 29 December, 1960 illustrate lake level fluctuation based upon hypothetical operating studies for the period 1930 to 30 September, 1959, inclusive. In that period, there were four severe drouths that would have resulted in low lake levels, two of them most serious. One commencing December, 1933 and extending through March, 1934 would have caused the water to drop to the top of inactive pool, elevation 573. (This means 30,000 acre-feet of storage would have been in the lake). It would have recovered to about 581 within the next couple of months or less, stayed above 580 until September, and then recovered to elevation 600 by mid-January, 1935. In the other drouth, beginning in December, 1939, the pool would have dropped to 573 near the end of January, recovering in the next couple of months to about 580. In the following month, or more, it would have gotten up to 593.

A further check on the drouth capabilities of Lake Shelbyville storage can be obtained from extensive studies of southern Illinois streams (Hudson, 1955). The runoff ranges from 10 inches at the northern tip of the watershed to about six inches at the southern tip, averaging 7.5 to eight inches for the entire watershed. (See Plate II-9.) This means that 36 months, producing eight inches of runoff, would yield a little less than 440,000 acre-feet. Assuming that when the drouth began the water elevation would be at the top of the joint-use pool, then the lake would have had 210,000 acre-feet of total storage, giving a gross amount of 650,000 acre-feet for the three years. Abstracting 171,000 acre-feet for evaporation, seepage and minimum outflow of [illegible]0 cfs throughout the three year period, a net storage of about [illegible]79,000 acre-feet remains at the end of the three year period. Additional releases for navigation above 10 cfs could be made.

Recreation would continue through a good part of this severe three year drouth. Any water supply requirements within the original 25,000 acre-foot allotment would be satisfied. The Illinois studies further indicated that the probable recurrence interval for this particular drouth ranges from 5 to more than 10[illegible] years. An estimate of the frequency of the 1952-5[illegible] drouth indicated a recurrence interval of 83 years.

<u>Flood Storage.</u> According to pool stage frequency studies, water should reach the top of the flood control storage pool at elevation 626.5, with a recurrence interval of over 100 years. At 630.5, the top of the induced storage pool, the frequency curve suggest a very long recurrence interval.

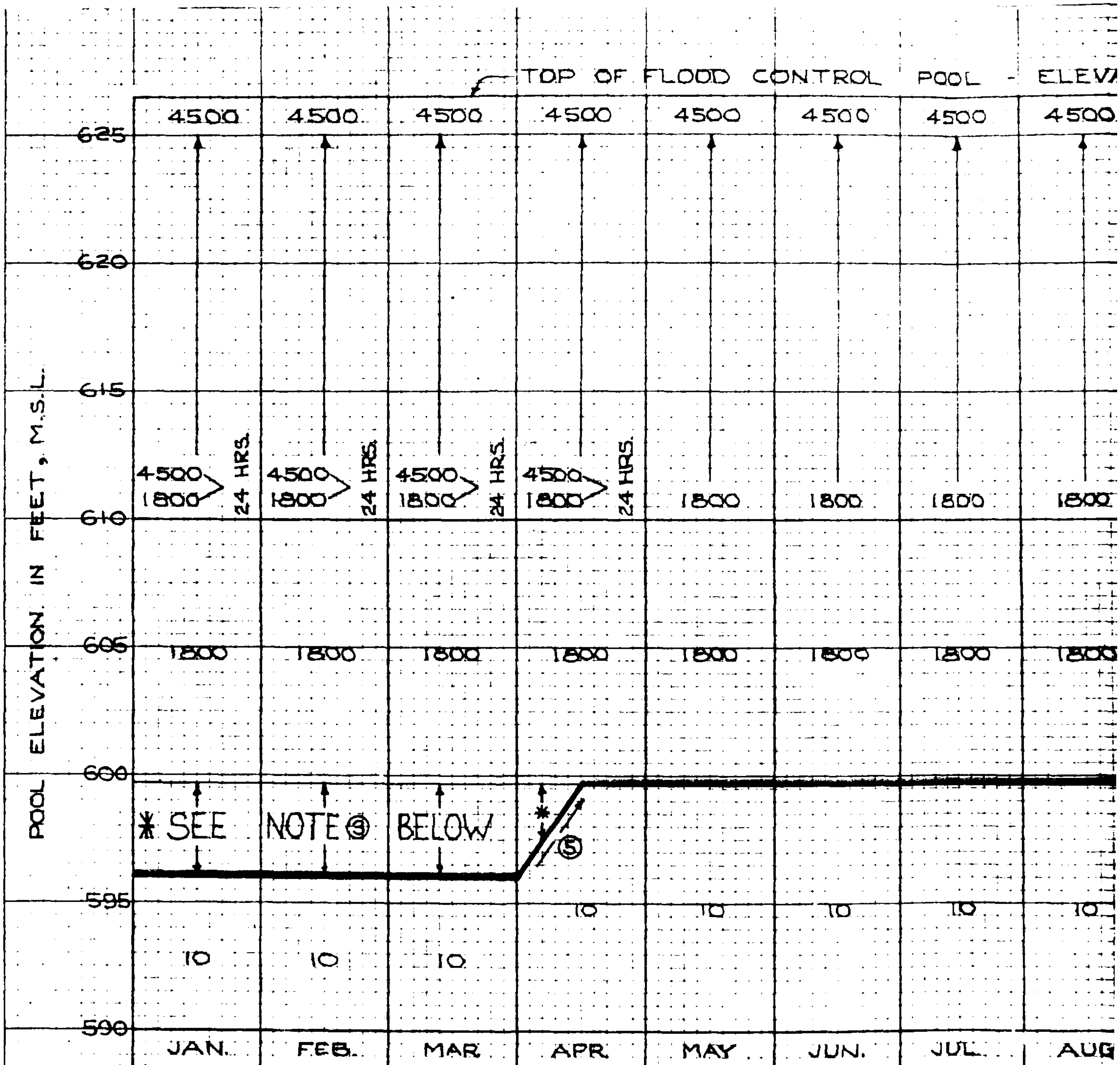
<u>Carlyle Lake and Lake Shelbyville.</u> An analysis of the joint operation of Carlyle Lake and Lake Shelbyville has been developed (U. S. Army District Engineer, St. Louis, December 1, 1969). These analyses and the

resulting choice of operating schedules of releases are discussed in detail in Appendix E. The chosen plans of operation result in the most equitably distributed damage based upon sound hydraulic considerations. The current plan of operation is described briefly in Part I. (See Plate I-3 for recorded daily operation.) Of the nine plans studied, plan VII was recommended for long-range use when the navigation project becomes operational. (See Plate II-10.) Since Lake Shelbyville went into official operation on August 1, 1970, an interim plan designated plan VI (see Plate II-11) has been in use. This plan is characterized by a greater lake level drawdown (to 590 feet) between December and April, because depleting the lake is less hazardous when navigation releases are not required. The only difference between regulation schemes VI and VII is that VI permits the pool to drop to elevation 590 during the winter months, whereas plan VII calls for drawdowns to 596 during the winter months.

Spillway Design Storm and Flows. One of the most critical aspects of artificial impoundments is the provision of a satisfactory spillway. It is essential that the spillway design, hydrologically and hydraulically, be capable of handling the maximum possible precipitation runoff routed through the lake. Extensive studies have developed the meteorological factors which could lead to the "maximum probable precipitation" for a specific area. The spillway storm chosen for the design of the Lake Shelbyville dam and spillway structure assumes a six hour rainfall totalling 22.14 inches, a total abstraction of 3.02 inches, and a rainfall excess total of 19.12 inches. This is the volume of water that must be routed through the lake. Two conservative initial pool elevations have been assumed: one, with the routing started at elevation 626.5 (the top of the flood control pool) results in a natural peak runoff of 415,000 cfs and a maximum spillway discharge of 162,500 cfs into the Kaskaskia Valley. This assumes a hydrograph representing a 25 percent increase in concentration above that for a normal inflow hydrograph. With this same assumed inflow hydrograph, but a routing started at pool elevation 616.5, the spillway peak discharge reduces to 140,600 cfs. The pool elevation for these respective routings reaches elevation 638.7 in the first instance and 634.7 in the second. The higher of these pool elevations has been assumed in the design of the impoundment and the spillway structure. Such a flood should have an extremely long recurrence interval.

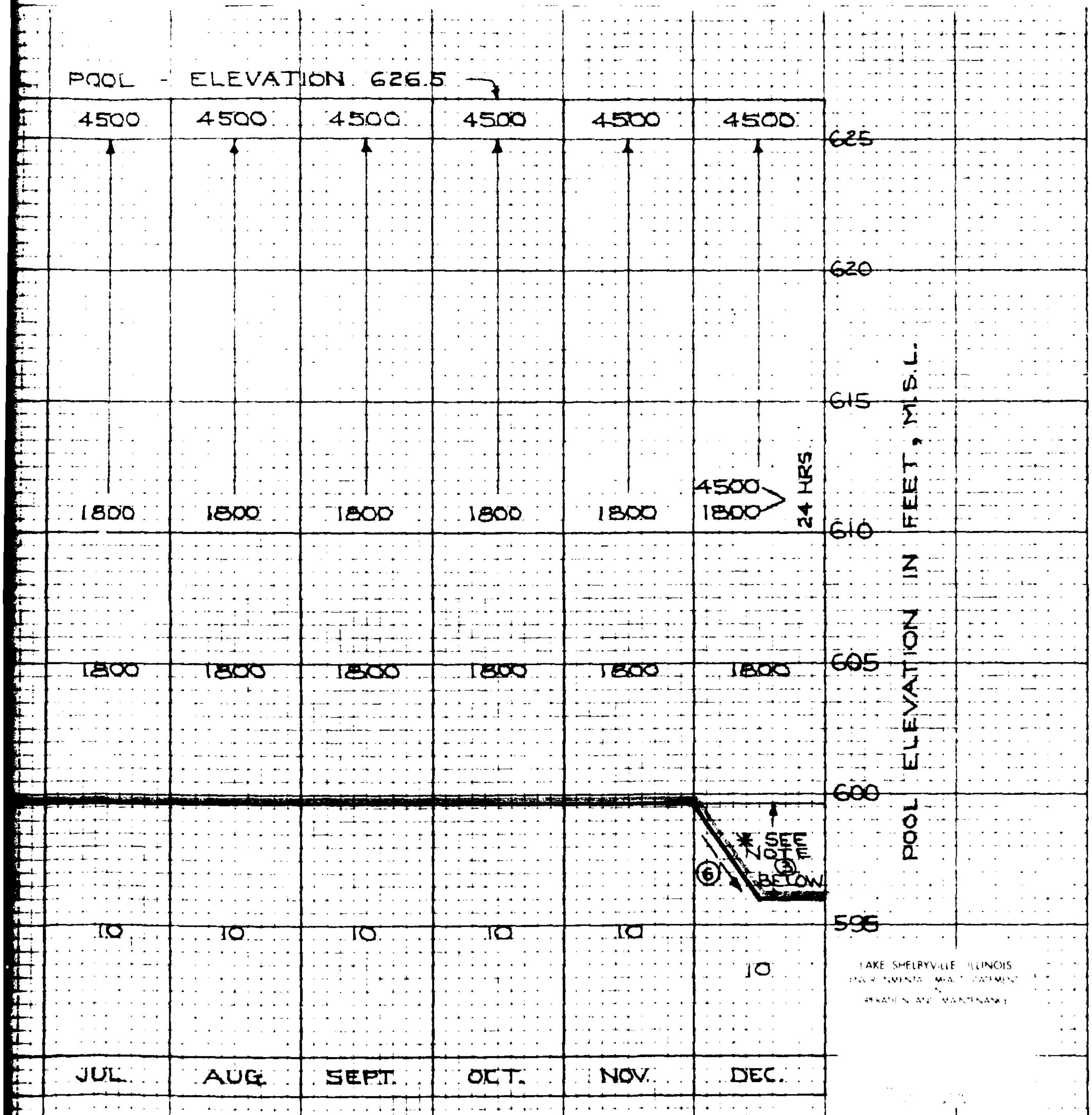
Water Quality

Generally speaking, the quality of south-central Illinois surface water is not good because the water is high in nutrients. Illinois farmers apply large amounts of commercial fertilizer to their land in order to increase crop yields. Corn, the major cash crop, is fertilized in excess of the growing plants' nitrogen demands. Nitrate-nitrogen not utilized by crops washes out of the fields and into local streams, becoming available to aquatic organisms. Phosphate, the second major nutrient, is bound onto soil particles and enters surface waters with silt washed from agricultural lands. Agricultural runoff contributes the largest amounts of phosphates to the surface waters of Lake Shelbyville, with only minor amounts being contributed by domestic and industrial wastes.



NOTES

1. SEASONAL NORMAL POOL TO BE MAINTAINED.
2. WHEN POOL IS ABOVE ELEVATION 610 AND FALLING; HOLD MAXIMUM
UNTIL NORMAL POOL IS REACHED.
3. * DRAWDOWN RELEASE = INFLOW + 1300 C.F.S. BUT NOT TO EXCEED 18
4. ↑ ARROW INDICATES UNIFORM VARIATION IN RELEASE.
5. BEGINNING APRIL 1ST – RELEASE MINIMUM FLOW (10 C.F.S.) UNTIL POOL
6. BEGINNING DECEMBER 1ST – LOWER POOL TO ELEV. 596.0 BY USE OF



OLD MAXIMUM RELEASE

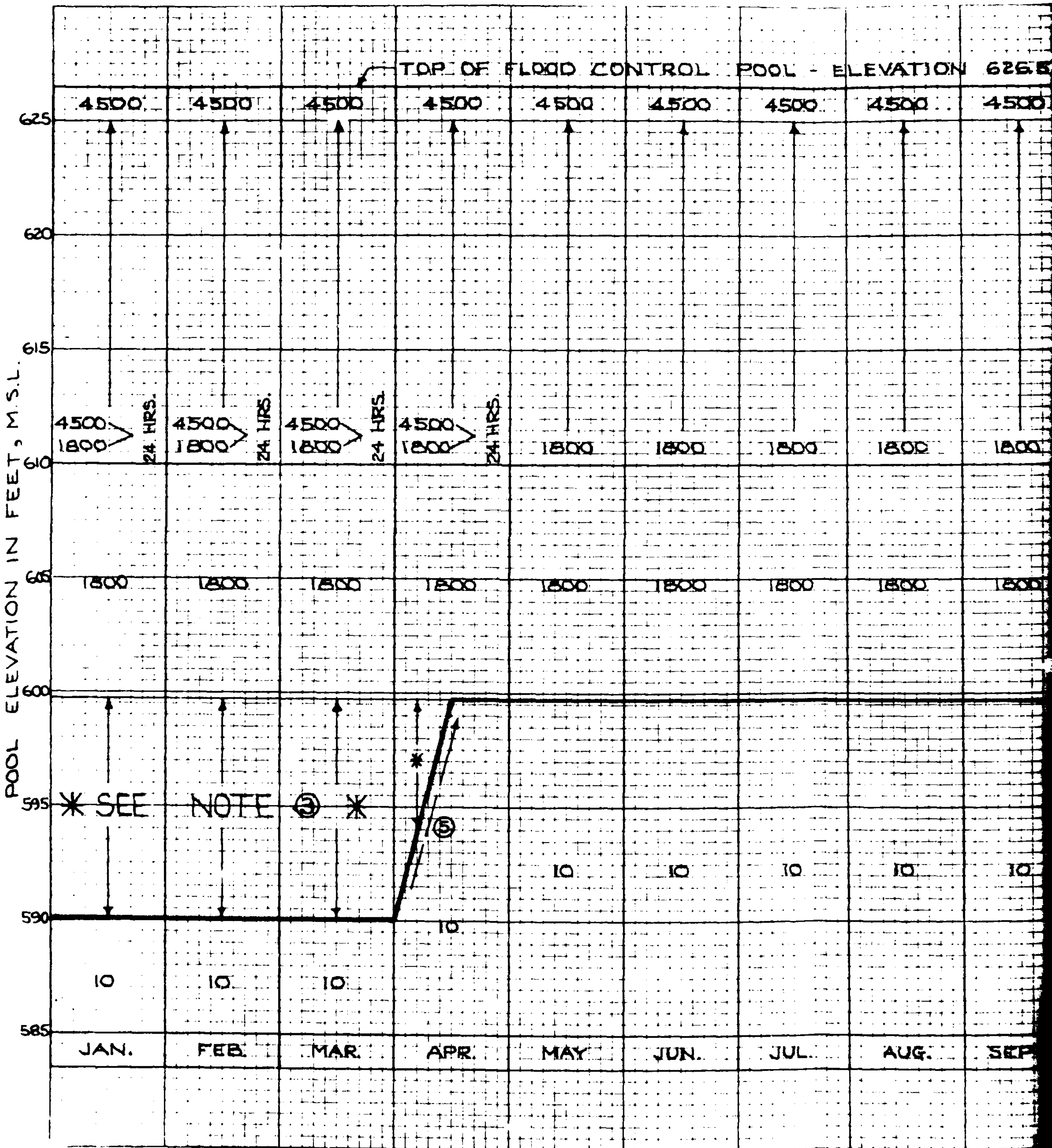
T TO EXCEED 1800 C.F.S.

C.F.S.) UNTIL POOL REACHES ELEV. 599.7.
96.0 BY USE OF *DRAWDOWN RELEASE.

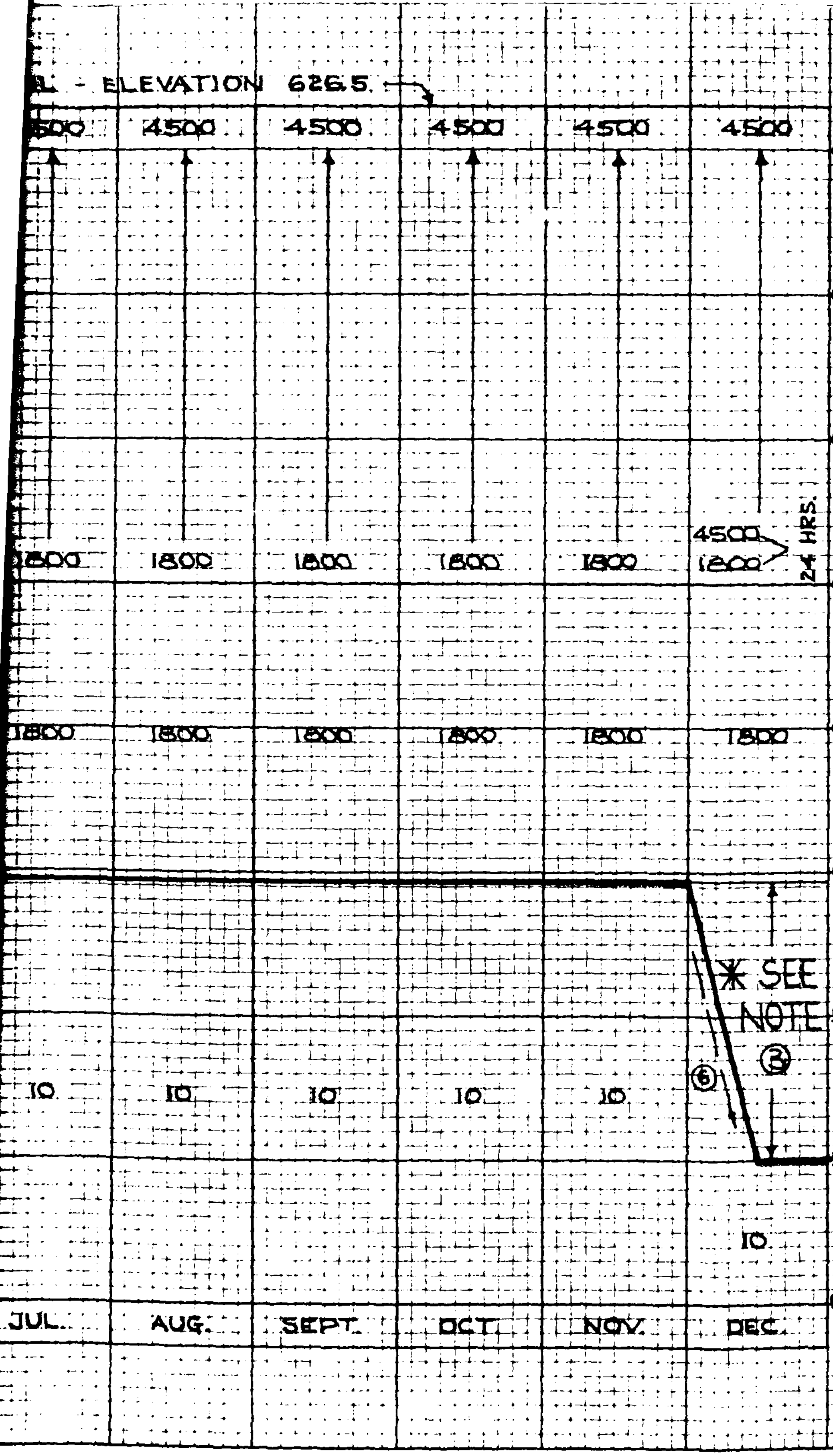
LAKE SHELBYVILLE, ILLINOIS
JOINT OPERATION

SCHEDULE OF RELEASES
PLAN VII

LONG RANGE PLAN



TOP OF FLOOD CONTROL POOL - ELEVATION 626.5
4500
4500
4500
4500
4500
4500
4500
4500
4500
4500
1800
24 HRS.
1800
1800
1800
1800
1800
1800
1800
1800
1800
1800
1800
* SEE NOTE ③ *
⑤
10
POOL ELEVATION IN FEET, M.S.L.
625
620
615
610
605
600
595
590
585
JAN.
FEB.
MAR.
APR.
MAY
JUN.
JUL.
AUG.
SEP



NOTES:

1. SEASONAL NORMAL POOL TO BE MAINTAINED.
2. WHEN POOL IS ABOVE ELEV. 610 AND FALLING; HOLD MAXIMUM RELEASE UNTIL NORMAL POOL IS REACHED.
3. ✱ DRAWDOWN RELEASE = INFLOW + 1300 C.F.S. BUT NOT TO EXCEED 1800 C.F.S.
4. ↑ ARROW INDICATES UNIFORM VARIATION IN RELEASE.
5. ↗ BEGINNING APRIL 1ST – RELEASE MINIMUM FLOW (10 C.F.S.) UNTIL POOL REACHES ELEV. 599.7.
6. ↘ BEGINNING DECEMBER 1ST – LOWER POOL TO ELEV. 590.0 BY USE OF ✱ DRAWDOWN RELEASE.

LAKE SHELBYVILLE, ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
ON
OPERATION AND MAINTENANCE

LAKE SHELBYVILLE, ILLINOIS
JOINT OPERATION

SCHEDULE OF RELEASES
PLAN VI
INTERIM PLAN

PLATE II-11

When water high in nutrients is impounded, the resulting lake can be eutrophic. Algae are abundant and their growth rates high. They die, sink to the bottom, and are attacked by bacteria that utilize dissolved oxygen from the water. The consequent oxygen dificit, particularly at depths where mixing is slow, makes the deeper water of lakes unsuitable for fish and most other aquatic life during the warm season. Lake sediments, including soil particles and dead aquatic organisms, trap nutrients that would otherwise be carried downstream, so that after the water leaving a lake is re-oxygenated, it may be of higher quality than the water entering the lake. At present, nutrient levels are considered not high enough to contribute a serious or even moderate state of eutrophication at Lake Shelbyville.

Data collected during 1972-73 from water sampling stations above, in and below Lake Shelbyville were used to evaluate water quality. Nine of the stations are operated by the Illinois Natural History Survey, and the Illinois Water Survey runs the tenth. (See Plate II-12.)

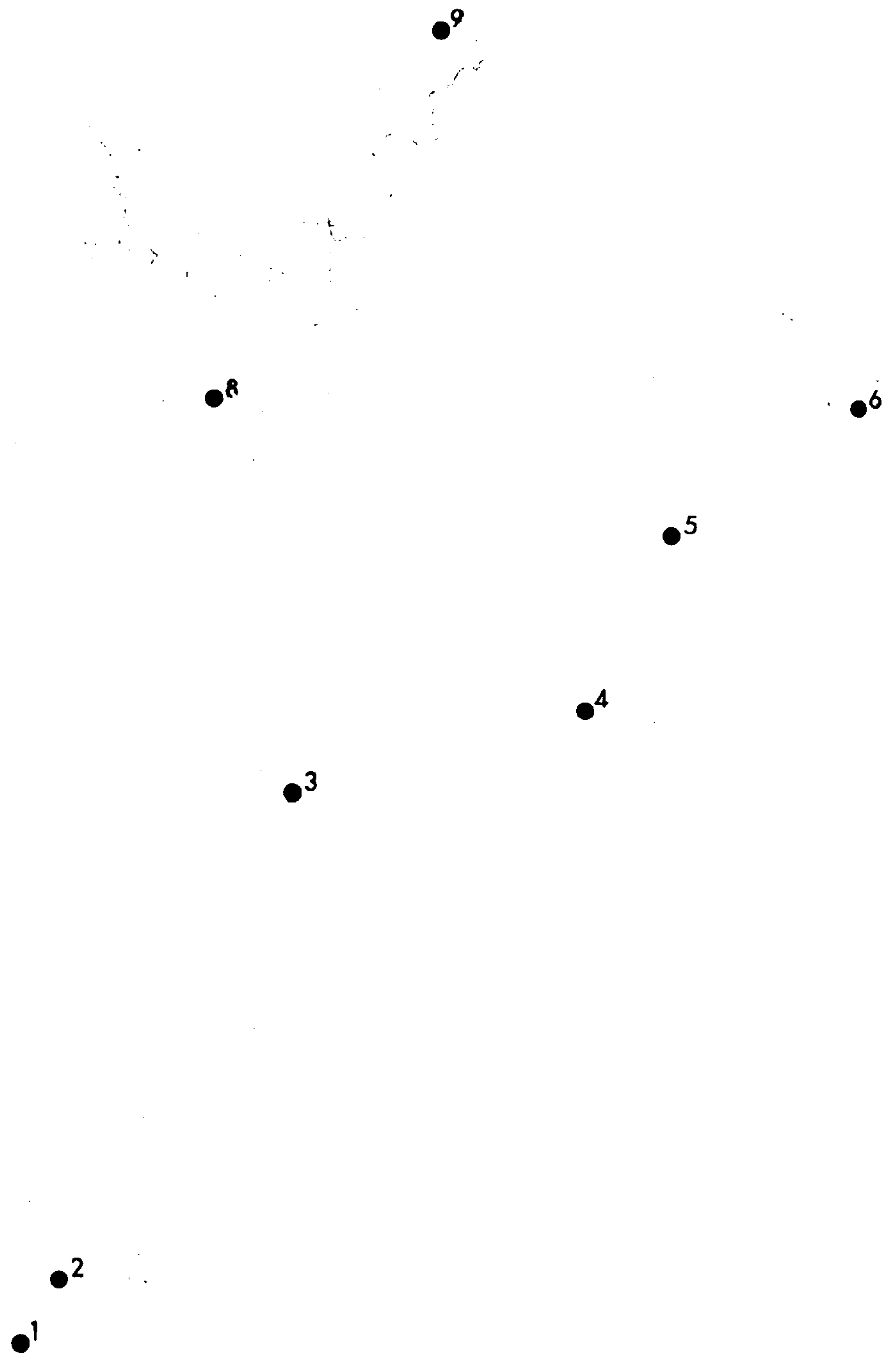
Water Temperature. During the summer when thermal stratification takes place, the lake's deeper water, or the hypolimnion, is colder than the surface water. The tailwaters are generally colder than the stream water that enters the lake because the dam discharges water from an elevation of 550 feet. Surface water temperatures of about 80° F. have been recorded at the lake stations during the summer. Such water temperatures are suitable for warm, but not cold, water fish and for public water supplies.

Chemical Oxygen Demand. "Chemical oxyg n demand values yielded so little usable information that this parameter might well be discontinued or reduced to quarterly determinations" (Brigham, 1973, p.39). C.O.D. is not discussed in the Water Pollution Regulations of Illinois, but values for the lake and tributaries fall within the ranges commonly found in surface waters, and should not adversely affect aquatic life, water supply, or recreation.

Total Alkalinity. Again, this parameter is not included in the Water Pollution Regulations of Illinois, and the values are unremarkable. Alkalinity is higher in the streams than in the lake, with a mean of 209 mg/l $CaCO_3$ at stream station 7, 141 mg/l $CaCO_3$ at station 3, 15 meters, and 171 mg/l in the tailwaters. (See Plate II-1?.)

Specific Conductance. Specific conductance reflects water's ability to carry an electric current and is expressed in mhos per centimeter. This parameter is also used to estimate total dissolved solids. A mho is the reciprocal of an ohm. An ohm is a measure of resistance. Specific conductance is usually less than 1,000 micromhos per centimeter for waters in the eastern United States (Rainwater and Thatcher, 1960). Stream, impoundment and tailwater specific conductance values generally run between 400 and 600 micromhos per centimeter, and do not vary much from station to station.

Sedimentation. Shelbyville dam will trap 97% of the sediment entering the lake. An estimated 217 acre-feet of sediment will accumulate annually. With 30,000 acre-feet of storage provided in the lake for this purpose, it will take over 100 years before sedimentation effects will impede any project purpose. A sediment range network has been established which is surveyed on a schedule basis to determine the locations, rate of deposition and the effects of future sedimentation.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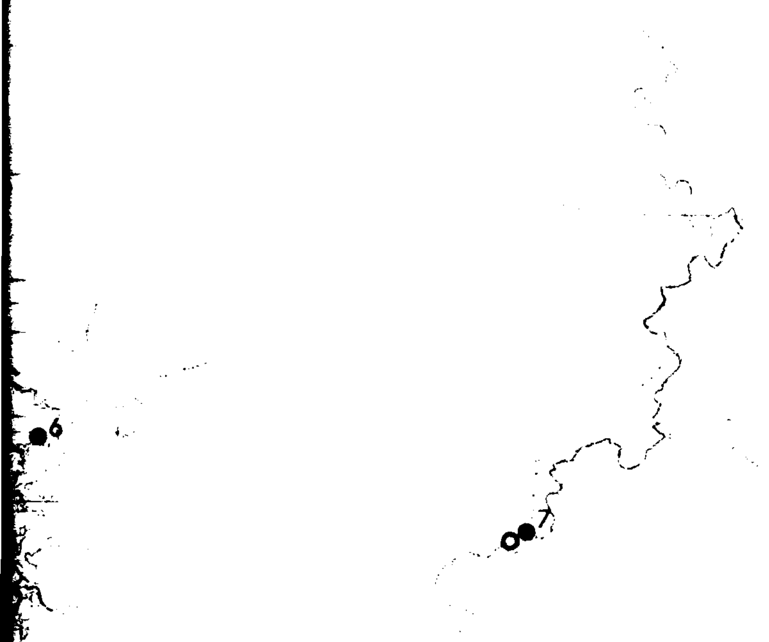


LOCATIONS OF WATER QUALITY SAMPLING STATIONS

○ ILLINOIS STATE WATER SURVEY STATION

● NATURAL HISTORY SURVEY STATION

PLATE II-12

Turbidity. Lake and tailwater turbidity is generally low enough so that water appears clear. Turbidity increases when silt is carried into the lake after storms. Algae apparently do not presently contribute substantially to lake turbidity, although water-clouding "blooms" may occur in the future. Stream turbidity is usually higher than lake turbidity, increasing with runoff that carries silt from surrounding farmlands. Present turbidity levels do not adversely affect aquatic organisms.

Nitrogen. According to the Illinois Natural History Survey, all upstream stations occasionally exceed the maximum nitrate-nitrogen concentration of 10 ppm allowed in Illinois (State of Illinois, 1972). The lake and tailwaters show lower nitrate levels because this nutrient is first utilized by algae and then by organisms that eat algae.

Phosphorus. "No station in the Lake Shelbyville basin would meet the standards established for phosphorus" (Brigham, 1973, p. 2). (See Plate II-12.) Station 5, located on Asa Creek below Kaizer Chemical Company's storm drain and the City of Sullivan's sewage treatment plant, has by far the highest concentrations. The other stream stations are also higher in phosphates than lake stations. The lake at 10 meters (about 33 feet) shows the lowest levels, suggesting that phosphate is being utilized by algae and/or trapped in the sediment.

Sulfate. Because of sulfate leaching from a calcium sulfate dump established by the industrial complex at Tuscola (Brigham and Gnilka, 1973) and high sulfur coal underlying the area. Lake Shelbyville and its tributaries are fairly high in sulfate. Lake station 3 has the lowest overall sulfate values, suggesting that lake sediments are trapping this compound, a possibility which low tailwater sulfate readings tend to confirm. No stations exceeded the Federal water quality sulfate maximum of 250 mg/l (U. S. Department of the Interior, 1968).

pH. This parameter measures the acidity of water: pH7 is neutral. The pH is unremarkable for all stations, ranging from 6.8 to 8.4. Values from pH 6.0 to 9.0 are considered acceptable by the Illinois Environmental Protection Agency for aquatic life and domestic water supplies.

Dissolved Oxygen. Dissolved oxygen at the lake surface, in stream stations and in the tailwater, is adequate to good, ranging from 6.8 mg/l (about 80 percent saturation at 75° F.) to 200 percent of saturation. Five mg/l is generally required to maintain diversified warm water biota. However, the deeper waters of the lake suffer from severe oxygen deficits during the summer months. For example, from June through September, dissolved oxygen at station 3, 10 meters (about 33 feet) is practically absent. Deficits occur at five meters (about 16½ feet) and occasionally even closer to the surface, limiting fish to the upper waters.

Biochemical Oxygen Demand. All stations checked by the Illinois Natural History Survey on a quarterly basis fell within the range established by Illinois regulations, indicating that organic loading is not excessive.

Fecal Coliform Bacteria. High fecal coliform counts may indicate sewage pollution or animal waste runoff from feed lots. The 1972-1973 water sampling data from the Illinois Natural History Survey show that stream stations consistently had the highest facal coliform counts, while lake stations had the lowest. High coliform counts occasionally occurred in winter, suggesting that such pollution is not related to lake use. Generally speaking, Lake Shelbyville's waters did not exceed the maximum allowable fecal coliform count for swimming or for boating.

Water Quality Evaluation. Data from the Illinois Natural History Survey's water quality sampling program indicate that Lake Shelbyville's water is better in most respects than the stream water entering the lake. In effect, the lake acts as a settling basin in which silt, organic material and some compounds are trapped in lake bottom sediments.

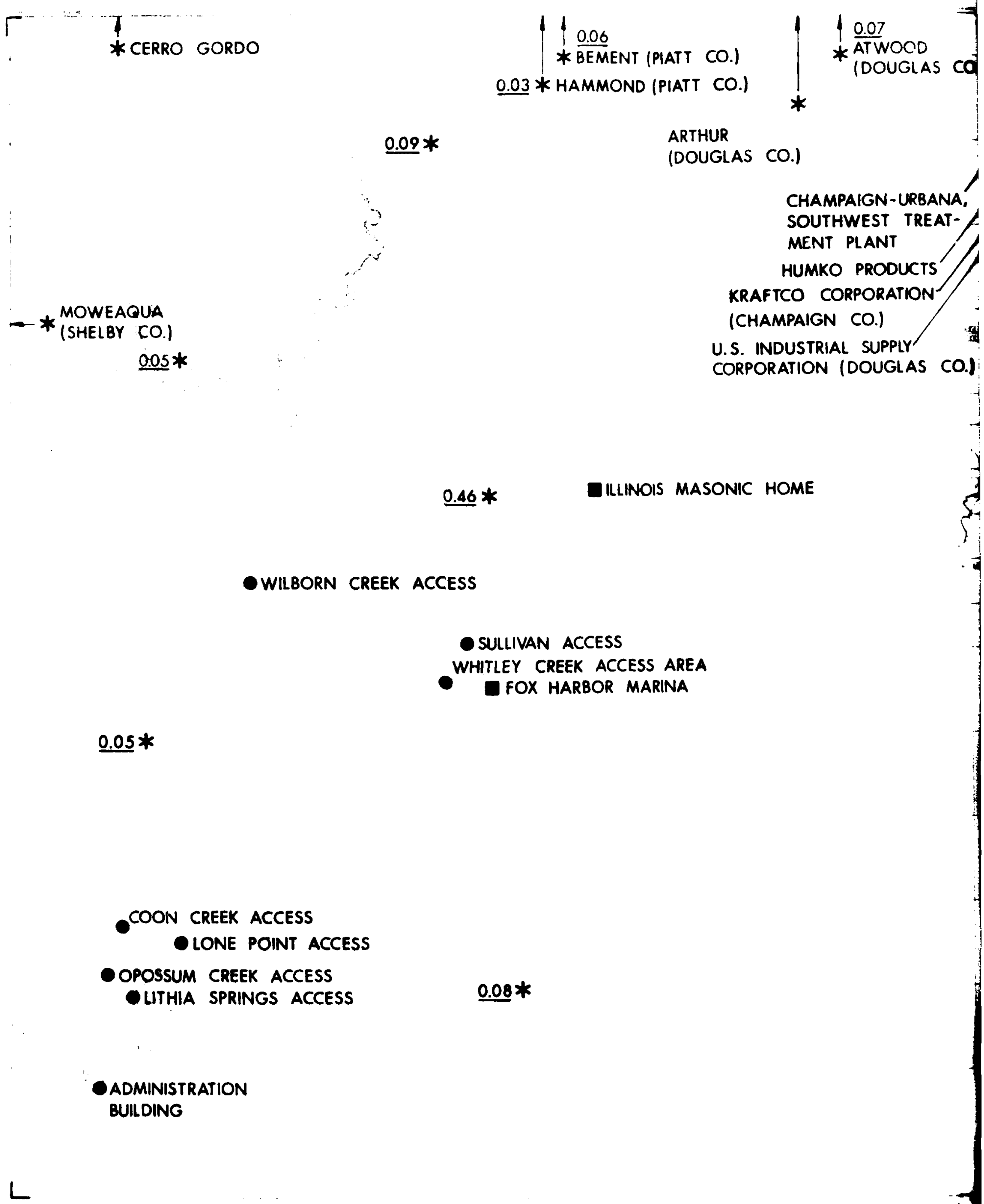
Lake Shelbyville's major water quality problem is the oxygen dificit in the deeper water during summer thermal stratification. Dissolved oxygen below 16 feet is often insufficient to support fish during the recreation season. Algal blooms and subsequent decay contribute to the oxygen deficit. Algal growth depends upon nutrients such as nitrates and phosphates, and these nutrients enter the surface waters from agricultural lands and, to a lesser extent, from domestic waste discharges. Both nitrates and phosphates are present at high concentrations.

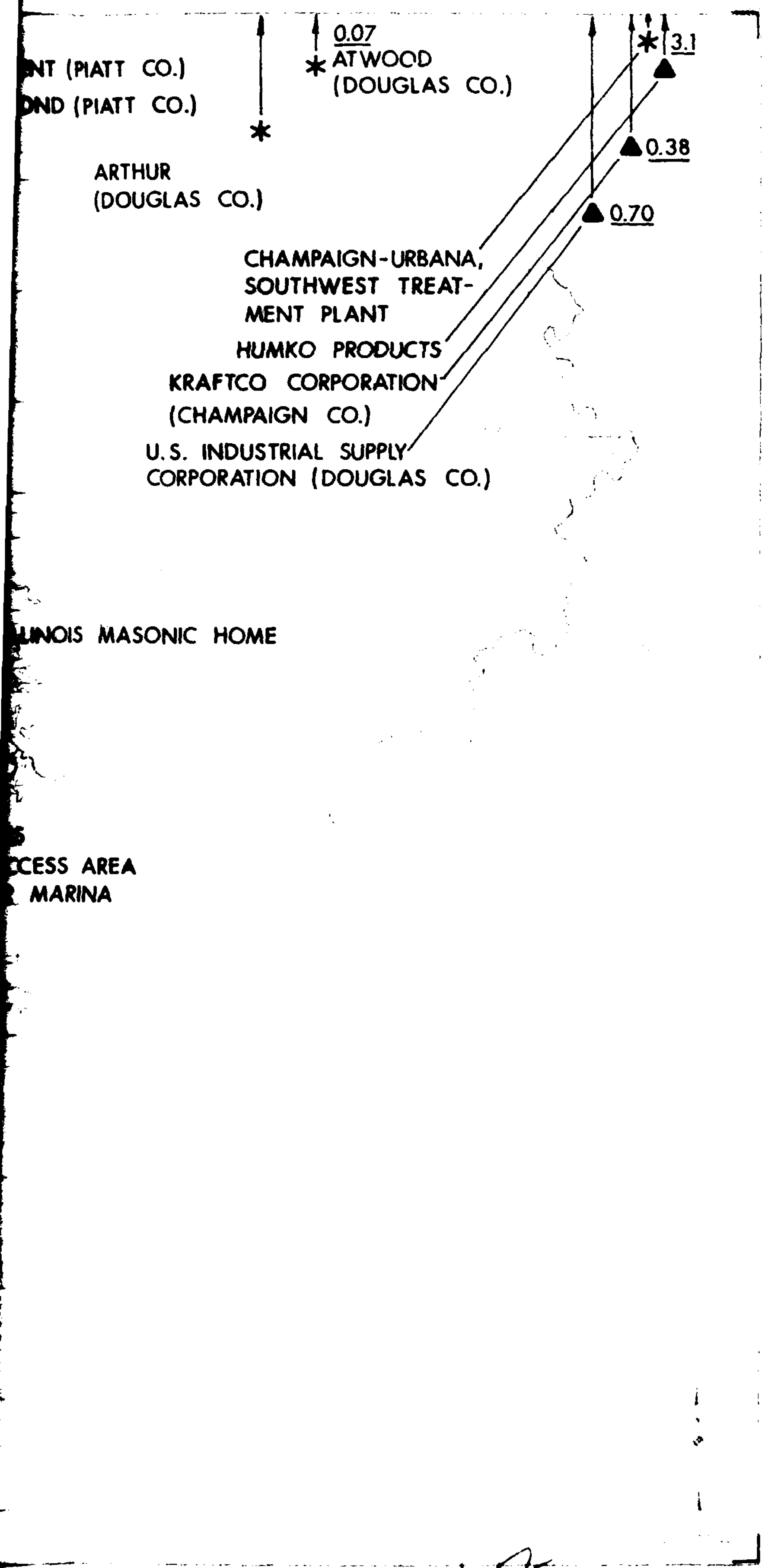
During periods of stratification, discharge of lake water from elevation 550 feet m.s.l. has sometimes resulted in the release of hydrogen sulfide, causing foul odors. A fish kill during the summer of 1971 has also been attributed to production of hydrogen sulfide. The formation of hydrogen sulfide occurs in oxygen depleted water where organic decomposition is significant or where sulfates are available for reduction. Decomposing organic debris left in the lake prior to filling may be the major cause of recent problems.

High concentrations of fecal coliform bacteria during the recreation season could constitute another water quality problem. The presence of fecal coliforms indicates sewage pollution or runoff from areas with high concentrations of farm animals. Because the streams entering Lake Shelbyville show such high concentrations, much of the fecal coliform bacteria must be coming from domestic waste and feedlot runoff upstream.

Water Pollution Sources. Fertilizer nitrates and phosphates are a major source of pollution that could affect Lake Shelbyville's water quality. Precipitation leaches nitrogen from the soil of surrounding farmlands, and it is carried into streams that drain into the lake. Phosphates are attached to soil particles. Nitrate and phosphate-rich runoff from feedlots near the lake are another source of pollution. Such runoff may also contain fecal coliform bacteria from animal waste.

Effluent from the eight sewage treatment plants located near public recreation areas is drained into the lake and could provide a potential local source of water pollution. (See Plate II-13.) If the plants do not function properly, excessive nitrates, phosphates and fecal coliform


CERRO GORDO
0.06
BEMENT (PIATT CO.)
0.03
HAMMOND (PIATT CO.)
0.07
ATWOOD
(DOUGLAS CO
0.09
ARTHUR
(DOUGLAS CO.)
CHAMPAIGN-URBANA,
SOUTHWEST TREAT-
MENT PLANT
HUMKO PRODUCTS
KRAFTCO CORPORATION
(CHAMPAIGN CO.)
U.S. INDUSTRIAL SUPPLY
CORPORATION (DOUGLAS CO.)
MOWEAQUA
(SHELBY CO.)
0.05
0.46
ILLINOIS MASONIC HOME
WILBORN CREEK ACCESS
SULLIVAN ACCESS
WHITLEY CREEK ACCESS AREA
FOX HARBOR MARINA
0.05
COON CREEK ACCESS
LONE POINT ACCESS
OPOSSUM CREEK ACCESS
LITHIA SPRINGS ACCESS
0.08
ADMINISTRATION
BUILDING



SEWAGE TREATMENT PLANTS

- ✱ MUNICIPAL TREATMENT PLANTS
- ● CORPS TREATMENT PLANTS
- ■ PRIVATE TREATMENT PLANTS
- ▲ INDUSTRIAL TREATMENT PLANTS
- <u>0.01</u> 1970 EFFLUENT IN CFS DURING A 7-DAY LOW FLOW PERIOD

SOURCES:

(1) WASTEWATER TREATMENT WORKS DATA BOOK JANUARY 1972, ILL. E.P.A.

(2) THE 7-DAY 10-YEAR LOW FLOWS OF ILLINOIS STREAMS SINGH, K. & J. STALL (1973) BULLETIN 57 ILL. STATE WATER SURVEY

PLATE II-13

bacteria could enter the lake water. Sewage treatment plants are checked daily and can be shut off as soon as any problem arises. Marine toilets could also contaminate the lake.

Many small towns upstream from the dam have sewage treatment plants, and the effluent from these plants is pumped into streams that drain into the lake. (See Plate II-13.) For example, Sullivan's treatment plant effluent flows into Asa Creek, occasionally producing high concentrations of nitrate, phosphate and fecal coliform bacteria in the water. When municipal plants malfunction, or tertiary treatment is not provided, the effluent may be heavily polluted with a variety of chemical substances, and with fecal coliform bacteria.

Several industries located upstream in the drainage basin could release wastes that could contaminate the lake water. (See Plate II-13.) The wastewater from a food processing plant in Champaign-Urbana is treated by Champaign-Urbana Sanitary District's southwest plant, which drains into the Kaskaskia. An industrial complex that manufactures peteroleum products maintains its own wastewater disposal system on the Kaskaskia west of Tuscola. It was responsible for an organic compound spill, prior to dam construction, that produced a fish kill from the Tuscola site downstream to Shelbyville (Brigham, 1971). Several small industries are located in Sullivan and use the municipal sewage treatment plant. A phosphoric acid spill and an anhydrous ammonia spill have killed the fish in Asa Creek in the past. However, this problem has been corrected in recent years.

Mineral resources in the area are another potential source of pollution. For example, acid coal mine wastes have caused fish kills in the Kaskaskia and some of its tributaries in the past, and could do so again (Illinois Department of Conservation, 1965). Also, a small oil field that runs from the vicinity of Cooks Mill north toward Tuscola occasionally could release wastes or spill petroleum that would contaminate surface waters.

Use of Water Supplies. The principal sources of water supply for industrial and domestic use in Shelby and Moultrie Counties are wells.

Municipal and industrial supplies in Moultrie County are obtained locally in the flat of the Kaskaskia River, its tributaries, and in the 150 to 200 foot thick fill of the pre-glacial Middletown Valley. At many locations, the fill is composed primarily of clay containing sand and gravel lenses. The "North Well" of the town of Sullivan penetrates the following profile:

Description	Thickness (feet)	Depth (feet)
Clay	64	64
Sand and gravel	37	101
Hardpan	3	104
Gravel	3	107
Clay and gravel	22	129

Throughout most of Moultrie County, water for farm and domestic supplies is obtained from thin sand and gravel deposits within the drift.

Throughout much of Shelby County, domestic supplies of ground water are available from discontinuous deposits of sand and gravel associated with glacial deposits. High capacity sand and gravel wells are constructed in the buried bedrock valley of the ancestral Kaskaskia River. The city of Shelbyville withdraws its water supply from three wells drilled into the buried valley southwest of town. A representative profile of Shelbyville well No. 2 follows:

Description	Thickness (feet)	Depth (feet)
Soil, silty, sandy	5	0-5
Silt, sandy	5	5-10
Clay, silty, gravelly	5	10-15
Gravel, medium to coarse	10	15-25
Gravel, fine to medium	5	25-30
Gravel, medium to coarse	5	30-35
Gravel, fine to coarse, sandy	5	35-40
Sand, fine to coarse, gravelly slightly silty	5	40-45
Gravel, fine to coarse, very silty, sandy	5	45-50
Sand, medium to coarse, gravelly	15	50-65

The Illinois State Water Survey estimates the maximum quantity of water available from the three wells at 900 gallons per minute (gpm) or 1,300,000 gallons per day (gpd) without lowering the water level below the top of the screen in the center well. In the central part of the county east of Shelbyville, ground water is obtained from shallow Pennsylvanian sandstones at depths ranging to 150 feet. Distribution of water resources is officially the function of Water Conservation Districts, two of which serve Lake Shelbyville.

BIOLOGICAL ELEMENTS

General

The State of Illinois is near the western edge of the distribution of Eastern Deciduous Forest Formation and at the eastern edge of the original distribution of the Tall Grass Prairie. The oak-hickory association is the predominant climax forest type within the Lake Shelbyville area.

In general, oak-hickory forests developed along river valleys and on steeper hillsides throughout the central midwest. Gently rolling or nearly flat uplands supported the grasses and forbs characteristic of prairie vegetation. Marshes and swamps developed both on poorly drained upland sites and along floodplains.

The combination of forests, grasslands and wetlands provided a wide variety of habitat types. Fauna inhabiting the area were similarly diverse and includes species characteristic of both deciduous forests and of grasslands. Wetlands provided extensive habitat for both semi-aquatic resident species and for migratory waterfowl. Lake habitat was originally restricted to small natural features of the floodplain such as cut-offs and oxbows or to small and sometimes temporary upland ponds. Rivers and streams were the dominant aquatic habitat type of the central midwest and included riffles, pools and various bottom and bank habitats.

Two features of the location of Lake Shelbyville increase the potential diversity of its fauna over what might be expected from the nature of the habitat alone. First, it is within several overlapping waterfowl migration corridors (Bellrose, 1968) and within an area crossed by numerous other migrant birds and bats. If appropriate habitat exists, these species are likely to stop either for resting and feeding, or for breeding.

Second, the lake lies just to the north of the Shelbyville terminal recessional moraine and is, therefore, at the southern edge of the Wisconsinan glacial till Grand Prairie region (Smith, 1961) and just to the north of Smith's Southern herpetofaunal division. Smith points out that "The northern edges of this (Southern) division are not sharply delimited from the Grand Prairie and . . . (this area) . . . is in fact ecotonal in herpetofaunal composition." This means that amphibians and reptiles of both southern and northern Illinois may be expected in the area.

Environmental Changes Resulting From Settlement and Development

General Impact of Habitat Modifications

Most of the environmental impacts caused by man are the result of habitat modifications - either direct or indirect. Clearing of forests and plowing of the land were the first activities of settlement having major impacts on the environment of the Kaskaskia River basin. As the

population increased and technology advanced, major problems resulted from improper waste disposal, poor land management and extensive use of agricultural chemicals. Habitat modification is often widespread and long lasting. Many populations of plants and animals are extensively altered or even extirpated.

Impact of Settlement Prior to 1700

Prior to extensive farming in the Kaskaskia River basin by Europeans, the effects of human activities on the environment were minimal. Indians existed in small numbers and were transient. Indians may have been responsible for prairie fires, but the majority of these probably resulted from electrical storms. In any case, occasional burning of prairie land was an integral part of the ecosystem in that it played an important role in the long process of selection and evolution of species typical of prairies.

By 1650, a few people of French origin had moved into the Kaskaskia area. At first, trappers ran trap lines along the river during winter months. Later, missionaries established a few outposts of European settlement. The impact of trapping on populations of fur bearers such as beaver, mink and river otter, may have been fairly severe since these animals were nearly extirpated from some parts of the country. Settlement of the area by the French was very limited but by the 1700's, there were a few farms and sawmills along the river.

Influence of Agriculture Since 1700

Agriculture was important enough in the Kaskaskia basin between 1722 and 1763 that wheat was occasionally exported to New Orleans. During this period, virtually all cultivation was in bottomland areas. The flat, fertile uplands were poorly drained and covered by the nearly impenetrable prairie sod so that they were not used for cultivation until about 1830 when the steel plow became available. Somewhat later, drain tiles began to be installed so that wet areas could be converted to cropland. Channel modifications and levee construction along the rivers were undertaken to help expand the amount of land available for cultivation. By about 1900, nearly all available acreage was farmed. Expansion of the agricultural industry virtually eliminated the prairie. Forested areas remained primarily on slopes too steep for cultivation and wetlands were frequently either drained or protected by levees, or both.

Since the 1940's, there has been an increasing tendency to intensify farming. In many cases, this results in consolidation of property, larger acreages of a single crop, and reduction in the numbers of fence rows, wood lots and other semi-natural habitats. Efforts to eliminate animals and plants, other than the crop plant, are intense and sophisticated.

Wildlife may be strongly affected by the use of agricultural chemicals. Fertilizers, herbicides and insecticides usually have the greatest direct adverse impact on the aquatic ecosystem into which chemicals are transported by runoff. Siltation of streams is also increased by cultivation. Persistent pesticides may have a severe impact on a variety of non-target animals

because of concentration along food chains. The use of drain tiles facilitates movement of water, nutrients and other waterborne matter from the fields to the streams. Agricultural pollution and flooding have been aggravated by the rapid runoff resulting from tile drainage.

Preimpoundment Impacts on the Aquatic Environment

Changes in the aquatic environment caused by man have ranged from siltation and pollution of water to extensive structural modification of stream flow. Overgrazing, cultivation, clearing and construction are probably the major causes of increased siltation of surface waters. Use of fertilizers, operation of feedlots, and inadequate sewage treatment are the major causes of high nutrient levels, Industries are often responsible for release of more exotic pollutants to the environment. Changes in water quality are changes in the aquatic habitat, and result in changes in species composition and abundance through complex interactions involving all levels throughout the food web.

Structural modifications affecting stream flow also affect habitats. Most modifications such as levees, drainage canals, channel straightening , etc. tend to eliminate areas intermediate between completely aquatic and completely terrestrial environments. Wetland habitat has been substantially reduced by these practices.

Impact of Lake Shelbyville

Construction of Lake Shelbyville probably has had the greatest impact on the environment of the upper Kaskaskia River basin since the introduction of agriculture into the area. Well over 100 miles of stream and river have been replaced by about 17 square miles of lake. The drastic and sudden shift in habitat resulted in elimination of most of the organisms originally inhabiting the lake site. Over a period of many years, there will be a shift toward a new community structure and a new distribution of organisms adapted to the new circumstances. The greatest obstacle to achieving a stable community within and around the new lake is the fluctuating water level.

Biological Communities

Biological communities within the area can be considered as either terrestrial or aquatic. The rather large area between the highest and lowest water levels of the lake will be discussed with aspects of both aquatic and terrestrial community characteristics, depending on what organisms are most typical in a given zone.

Major Terrestrial Communities

Three major types of terrestrial habitat are distinguishable in the area within about one mile of the lake on the basis of vegetative cover. (See Plate II-14.) These are forest, old field or pasture, and cultivated land. Forest habitat is generally defined as an area with a relatively

AD-A116 129 ARMY ENGINEER DISTRICT, ST LOUIS MO F/G 15/7
ENVIRONMENTAL IMPACT STATEMENT OF OPERATION AND MAINTENANCE, LA--ETC (U)
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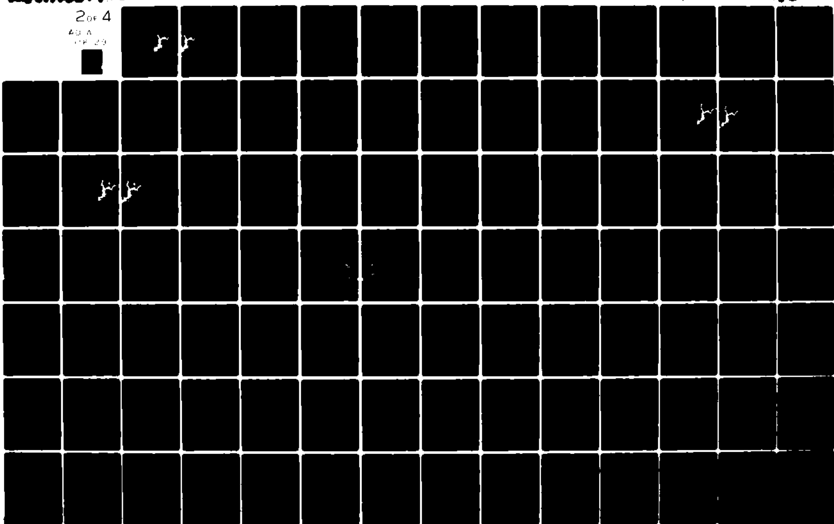
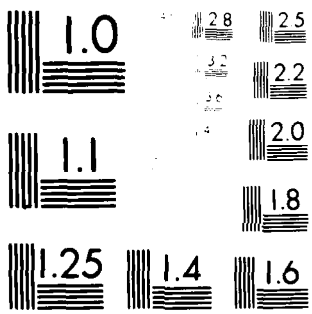
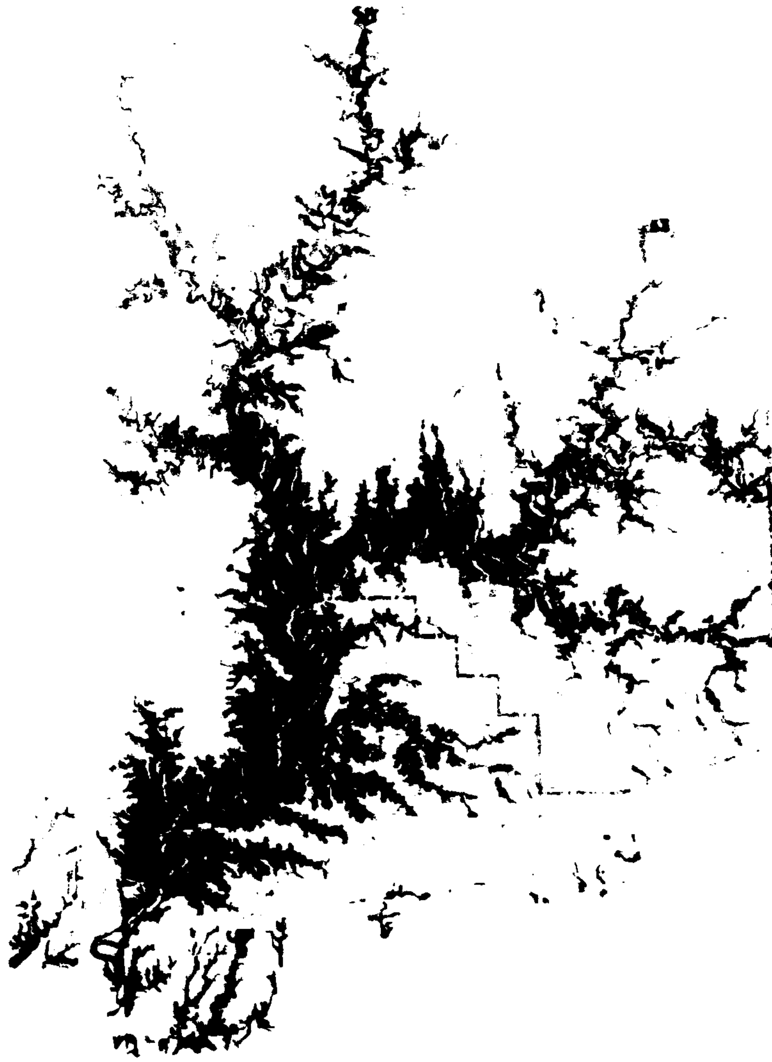
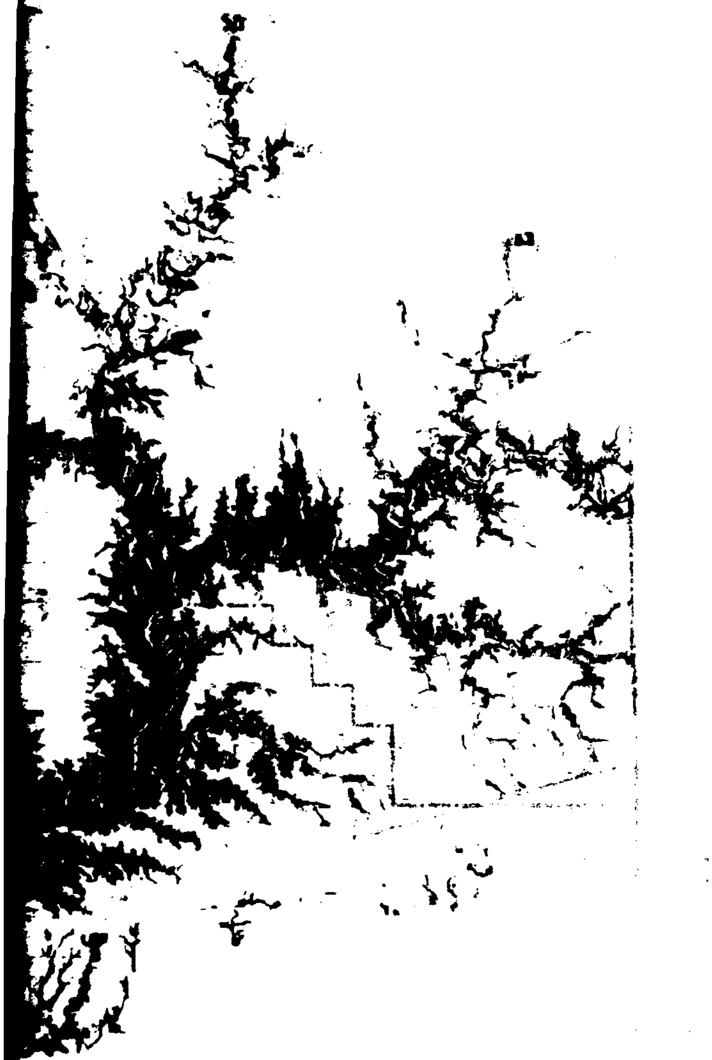




MICROCOPY RESOLUTION TEST CHART





HABITAT TYPES - 1974

LEGEND

- WOODLAND
- OLD FIELD OR PASTURE
- AGRICULTURE

NOTE: AREAS SHOWN REFLECT COVERAGE OF AERIAL PHOTOGRAPHS TAKEN JANUARY 1974

PLATE II-14

2

closed canopy of trees. Cultivated land includes areas which have been plowed and planted during the past one or two growing seasons. Old field includes successional habitats that develop after abandonment of a cultivated field, but before tree density is great enough to provide a relatively complete canopy. Pasture is not distinguished from old field for the purposes of mapping. Land which is used for pasture is often old field, but it may have been selectively cleared to open the forest canopy and promote herbaceous growth.

Less than one-third of the fee owned land is forested, but this represents a major portion of the forested land in the two-country area. About 16,000 acres of fee owned lands are either scrub or woodland (Appendix D, General Design Memorandum No. 7B, 1973), with probably about 9,000 acres being woodland.

Cropland is the most prevalent habitat type within the Lake Shelbyville area, but only small acreages of fee owned lands are cultivated. State management plans for 1973 call for 1,200 acres to be cultivated in 1974 (Lake Shelbyville State Management Plans, 1973). About 6,600 acres of fee-owned land which were cultivated prior to purchase are now in the early stages of succession.

There is considerable mixing of forested and old field habitats, but, in general, forested land is concentrated primarily on steeper slopes bordering the lower end of the lake. Old field communities are most prevalent along the upper reaches of the lake and on upland sites of fee-owned land. Cultivated acreage is generally toward the perimeter on upland sites which are in private ownership.

The Bottomland Forest. Species composition within a forest varies in a characteristic manner with moisture gradients. Bottomland forests are adapted to high soil moisture and periodic inundation. In the project area, dominant bottomland species include black willow, silver maple, eastern cottonwood, and sycamore. Because filling of the pool permanently inundated most of the Kaskaskia floodplain on fee lands, the only locations where bottomland forest remain are near the headwaters of the lake.

Willow often borders the stream channel in a bottomland area and is one of the first terrestrial plants to be come established on exposed sandbars. Silver maple is often abundant in frequently flooded areas, but may be mixed with some sycamore and cottonwood. Cottonwood is often found on sandy soils. Where flooding is somewhat less frequent, species such as boxelder, green ash and American elm may be common. Slightly drier sites support localized populations of bur oak, pin oak, white oak, swamp white oak, mulberry and black walnut.

Most of the bottomland forest area is within the wildlife management areas and farther upstream. Because much of the bottomland forest was cleared for agriculture, successional fields exist on most of the flatter areas which would normally be forested. Where water levels have been raised permanently or the duration of flooding has been increased significantly, even bottomland forest species have been killed.

Elements of a bottomland forest association are found along almost all of the ravines formed by small tributaries to the lake. Mature sycamores and some maples are nearly always found near the creeks. Well developed bottomland forests are not found in these areas since slopes are steep and there is almost no floodplain.

The fauna of bottomland forests differs from that of upland forests because of nearness to water, poorer drainage and wetter soils, and food species (plant and animal) associated with these conditions. Many species that are normally common in bottomland forests occur also in upland forests (terrestrial salamanders, numerous birds, a few mammals - notably tree squirrels and white-footed mice).

For species that are primarily aquatic, coming to land only for depositing eggs (aquatic turtles), or for species that feed on fish and aquatic invertebrates (osprey, kingfisher, raccoon, mink), the normal confinement to bottomland forests in the absence of impoundments may be due largely to the fact that water is not normally adjacent to upland forest. The invasion of upland forests by impounded water may provide sufficient habitat for these species.

For other bottomland forest species, abundant moisture (slimy salamander) or the presence of bottomland and emergent aquatic vegetation for food (beaver, muskrat) may be very important and not provided by the steep, well-drained sides of the impoundment.

The Upland Forest. Upland forests are well developed on many of the slopes surrounding the lake. Oaks and hickories are the most common upland trees with several different species of each group being represented. Black oak, post oak, shingle oak and white oak are primarily upland species with white oak dominating the vegetation in several areas. Shagbark hickory, shellbark hickory and pignut hickory also are found in upland forests. Sugar maple is often found on north facing slopes. Walnut, elm and hackberry are scattered throughout upland forests at various sites. The understory in mature upland forests contains seedlings and saplings of the dominant tree species, as well as mature individuals of smaller trees.

Many of the upland forests in the project area are immature. Climax forest species are present, but tend to be relatively young because logging operations in the past removed most of the large trees. Species composition of older age class trees has also been affected by logging. Walnut and white oak are particularly desirable hardwoods and may have been selectively removed from most areas.

Most upland tree species are not tolerant of inundation. When the lake was filled, most of the new shoreline was at an elevation where trees had never before been exposed to accumulations of surface water. Most trees around the shore of the lake have been killed by high water levels and more will probably die in the near future. Eventually, water tolerant species will replace the upland species which have died, but so far there is little or no evidence of seedling growth along most of the shoreline (Dufford, pers. comm.). There are 172 miles of shoreline at normal pool elevation and there

has been tree mortality along most of this length. It may be difficult for seedlings of water tolerant species to become established where water level fluctuations are of a large magnitude and long duration.

Upland forests support an extensive fauna of both resident and migratory species. Many of these species also make use of other habitats, particularly forest edges and old fields, but a number are generally restricted to forests. Three species of amphibians and six species of reptiles are exclusively forest species. The ranges of several of these species abut the project area, but their presence has not been established. Thirty-seven species of birds are usually found primarily in the forests. The most likely of these on the project are the osprey, great horned and barred owls, belted kingfisher, several woodpeckers, several flycatchers and a number of warblers. At least forty other species of birds are found in forests as well as other habitats. In mature forests, the most common mammals are the opossum, seven species of bats which may summer in the area roosting in trees when not feeding on insects; raccoon, gray fox, Eastern chipmunk, Eastern gray and fox squirrels, Southern flying squirrel, white-footed mouse and white-tailed deer. Most of these mammals venture into other habitats occasionally, but live primarily in forests.

<u>Old Fields and Pasture.</u> Cultivated fields or pastures which are abandoned rapidly become covered with weedy vegetation. During the first few years, grasses and annuals are dominant with perennials becoming more and more numerous each year. After several years, shrubs and then small trees become established. When the area is fairly well shaded, seedlings of climax forest species begin to become established and eventually grow to become the dominant species.

Many of the old fields on fee-owned land have undergone succession for 8-12 years since crops were last cultivated. Many perennials are still present in abundance. Shrubs and small trees are abundant. Many of these species such as raspberry, hawthorn, locust and rose are thorny and frequently form thickets. They may have a survival advantage over other plants in that they are less desirable for browse. Osage orange is often found in dense rows where it was planted as a fence and has proliferated. Sassafras, persimmon, black cherry, crabapple, and wild plum are small trees common to old fields and important to wildlife as sources of fruits.

Most of the privately-owned land in the Lake Shelbyville area is actively being cultivated, but some is used as pastureland. Pastures tend to be small and overgrazed. They are frequently along the upper reaches of creeks where land is too dissected to cultivate. Overgrazing of these areas creates severe erosion problems so that small streams frequently may be loaded with silt, animal wastes, and agricultural chemicals. Poorly managed pastures may be nearly devoid of herbaceous vegetation during certain seasons. Trees are sometimes sparse also, but scattered medium sized oaks or rows of osage orange are fairly common.

Although old fields and pastures are mapped together in this report, there are clear differences in the fauna of grassy pastures with occasional

trees, weed-stage old fields which have been fallow for one or two years, and old fields or orchards with extensive shrubby vegetation.

Species with clear preferences for grassy areas and pastures are the Eastern plains garter snake, meadowlarks, barn swallow, thirteen-lined ground squirrel and meadow jumping mouse.

Those preferring weed-stage old fields are the prairie king snake, savannah sparrow, bobwhite, dickcissel, striped skunk, red fox, Franklin's ground squirrel and cottontail rabbit.

Species preferring shrubby old fields and woodland edges are the Eastern garter snake, chickadees, mockingbird, rufous-sided towhee, orchard oriole, yellow-breasted chat, yellow-billed cuckoo, field sparrow, indigo bunting, yellow-throat, Eastern bluebird, American goldfinch, catbird, cardinal and brown thrasher. Mammals preferring shrubby old fields and field edges are the woodchuck and white-footed mouse, the latter predominantly a forest species.

For wide species diversity, particularly for birds, a variety of field types is desirable.

Cultivated Fields. Nearly all cultivated fields are on privately-owned portions of the upland surrounding fee-owned land, but about 1,700 acres within the Wildlife Management areas were leased to local farmers for cultivation in 1972. Leases require that a certain percentage of the crop be left on the land, and prescribe the crops which may be planted in a given year. During 1972, only corn was planted. Sizes of planted fields ranged between five and 76 acres, and about one-third of the crop was left in the fields. Total acreage cultivated was reduced to 1,200 acres in 1973.

Corn is the major crop cultivated on private land. Smaller acreages of wheat and soybeans are planted. Agricultural fields are managed intensively to minimize interference by plants other than those desired and to reduce loss of the crop to herbivores.

The fauna of intensively cultivated fields is composed primarily of birds, although a few mammals make inroads at the periphery. Cornfields provide a major source of food for birds, attracting horned lark, common grackle, house sparrow, mourning dove, red-winged blackbird, meadowlark, killdeer, barn swallow, sparrow hawk and a variety of other species. The same species are present in soybean fields. The most common birds of bare fields are the horned lark and killdeer. House mice, Norway rats, skunks, raccoons, and cottontail rabbits and their predators, including red foxes and coyotes, are also likely in cultivate fields.

Major Aquatic Communities

Three major types of aquatic habitats are found within the project area. Streams and rivers are habitats with flowing water and are widely distributed both above and below the lake. Impoundment of the river by

the Shelbyville dam has formed the second major aquatic habitat - the lake. Ponds, marshes, flooded fields and other sites where there are small accumulations of standing water constitute the third type of aquatic habitat.

Rivers and Streams. Tributary streams to Lake Shelbyville generally have turbid waters with high concentrations of nutrients. Agricultural and some industrial pollution are the main problems (Smith, 1971). Where streams are slow moving, primary productivity may be fairly high, but is limited by turbidity rather than availability of nutrients. Analysis of chlorophyll a, b, and c ratios indicates that green algae and euglenoids are the most common primary producers in streams - especially during July through October. Blue-green algae may also be abundant. Diatoms and algae are present in most streams.

A few benthic species characteristic of "clean" water are found in tributaries, but those adapted to a wide range of water quality are more common. Species composition of benthic communities of the tributaries is variable, but diversity is generally much higher than in the lake.

In 1964, Stinauer, using seine haul samplings and the rotenone-potassium sampling method along the Kaskaskia River, found 40 species of fish in nine families. Over 2,300 fishes were collected, of which 71 percent were forage, 16 percent commercial, and 13 percent sport fish (Stinauer, 1964). Of the species present, green sunfish, longear sunfish, grass pickerel, channel catfish, flathead catfish, yellow bullhead, smallmouth buffalo, carp, golden redhorse, and white sucker were predominant. Various species of minnows were taken throughout the length of the river. The most notable of these were the sand, red fin, red and bigmouth shiner, the stoneroller, creek chub and bluntnose minnow. These forage fishes seemed to be rather evenly distributed throughout the river (Bowman, 1974).

Most of the vertebrates utilizing streams and rivers are also able to use the lake habitat and are discussed in the next section.

Lake Shelbyville. Turbidity values of lake water indicate that sediments carried by tributaries settle to the bottom of the lake. Pooled waters and increased light levels in the presence of abundant nutrients result in rapid algal growth during the spring and summer. The species composition of phytoplankton is not known, but populations in lake surface water must be high since dissolved oxygen concentrations are frequently above saturation levels.

"Near oxygen depletion in the deep portions of the lake restricted the benthic community to those organisms adapted to low dissolved oxygen concentrations (Tubificidae and Chironomidae) or to organisms able to migrate to oxygenated water (*Chaoborus*) . . . Predominant benthic taxa were Tubificidae (sludge worms), Chironomidae (bloodworms or midges), *Chaoborus* (phantom midges), and Ceratopogonidae (biting midges) . . . The benthic communities at lake stations were characterized by a lack of additional taxa common to flowing water situations" (Brigham, 1973, p. 35).

Anaerobic decomposition of organic material accumulating on the lake bottom results in the release of methane and hydrogen sulfide, both of which are toxic gasses and may cause fish kills. Hydrogen sulfide production was a problem at Lake Shelbyville during late summer of 1971 and 1973, but the only problems that should be expected from hydrogen sulfide production would be in the case of new land being inundated.

Growth of algae in the lake is probably somewhat restricted by the depth to which warm water and light is available. The blue-green algae which generally grow to nuisance concentrations in nutrient rich lakes have not yet caused problems of the magnitude which might be expected. Studies by the Illinois Natural History Survey (Brigham, 1973) have shown that so far the upstream end of the lake, a transition zone between attached stream vegetation and unattached lake phytoplankton, is the most productive region.

Because fish are not able to survive in water with very low dissolved oxygen concentrations, they are restricted to the top several meters of the lake during summer when oxygen stratification is a problem. Because surface water is warm, no fish requiring cold water (i.e. trout) can be expected to do very well in the lake. Perhaps conditions other than a requirement for cold water are more responsible for the failure of Northern pike to do very well. In fact, Lake Shelbyville is characterized by warm water game and pan fish such as bass and crappies, and warm water "commercial" fish such as carp and buffalo. Indeed, the growth of fish planted in Lake Shelbyville has gone exceedingly well.

No reproduction of walleye or Northern pike has been noted in the lake. Gizzard shad produced a tremendous year class in 1973. Fair size broods of largemouth bass, blue-gill, brook silversides and golden shiner were also produced. Reproduction, although of a small scale, was noted for black bullheads, white bass, carpsuckers, green sunfish, carp and bluntnose minnows. Very little reproduction was noted for the crappies. The crappies are an early spawning species and it is possible that most of their young were consumed by the other predator species when the food base was so poor (Fritz, 1973).

Only two species of amphibians utilize the lake to any extent. One of these, the mudpuppy, a large gilled salamander, is completely aquatic, depositing its eggs under submerged rocks and logs (Shoop, 1965), the young evidently avoiding predation from fish by remaining hidden. The other is the bullfrog which escapes terrestrial predators by retiring to deep water and escapes fish predation because of its size.

There are a number of aquatic reptiles likely in the lake. Ten species of turtles, may be found in open water. All deposit their eggs on land in the early summer, but during the rest of the year range from virtually completely aquatic, seldom emerging except for egg deposition (common snapping turtle, stinkpot, map and false map turtles) to those that spend much of their time basking on partly submerged logs (soft shell turtles, red-eared turtle) and even far from water on land (painted turtles). Of the three species of water snakes in the area (*Natrix* spp.), two are primarily aquatic and only one (Graham's water snake) occupies sluggish bodies of water (lakes, ponds, marshes) as its preferred habitat.

There are numerous species of birds that are associated with water in the area. They range from the predominantly aquatic grebes, herons and waterfowl (in descending order of abundance; mallards, wood duck, widgeon, gadwall, teal, blue/snow geese, Canada geese, blue-bill and ringnecks), to marsh birds (coot, rails), shorebirds (killdeer) and woodcock, snipe and sandpipers. Others present are birds preying on fish (osprey, kingfisher) and a few passerine birds preferring situations adjacent to water (swallows, water thrushes, red-winged blackbird). The relatively small area of marshes, flooded fields and emergent vegetation discourages large numbers of migrant waterfowl from potential stopovers and discourages breeding in the area. The lack of sandbars and mudflats discourages major use by shorebirds and gulls.

Two relatively common mammals in the area (beaver and muskrat) are essentially aquatic, building lodges in banks along the lake. Several naturalists in the area believe that they have seen otters, but there is no confirmation of their presence. Other carnivorous mammals (raccoon, mink, opossum) frequent forested areas adjacent to the lake in search of drinking water and prey, often amphibians and reptiles. The forest dwelling white-footed mouse is known to search mudflats and banks for food, probably invertebrates (Terpening, et al., 1973).

Ponds, Marshes and Temporary Standing Water. Within the Kaskaskia unit of the Wildlife Management Area, there are two "marshes" covering 220 acres and separated from lake water by low dikes. These marshes are used as nursery ponds during early summer to raise stocked fingerlings to a size less subject to predation. After fish are released, marsh areas are planted in millet and flooded for waterfowl in October. No natural marshes exist on the project, but some marsh vegetation may eventually become established in inundated coves and shallow upstream reaches of the lake.

A number of small upland ponds exist around the lake. These all support good algal growth in the spring and summer and some have populations of floating duckweed, bottom rooted aquatic weeds, and emergent shoreline plants. Small ponds uninhabited by fish are necessary for amphibians. Most amphibians in the area must deposit their eggs in ponds or other water-filled depressions (ditches, partly flooded fields, etc.) that are free of fish because both amphibian eggs and larvae are subject to heavy fish predation. The small-mouthed salamander, Eastern tiger salamander, American toads, Western chorus frog, leopard frogs, Eastern gray tree frog, and Northern spring peeper are the most common visitors at ponds in the early spring, the latter species requiring woodland ponds. Some frogs over-winter at the bottom of ponds and, thus, require permanent ponds deep enough to remain unfrozen at the bottom.

Many aquatic, shore and marsh birds which utilize Lake Shelbyville utilize ponds as readily as larger bodies of water. Of the area's aquatic mammals, beaver and muskrat could easily inhabit large woodland ponds. Raccoon, mink, opossum and white-footed mice, although forest dwellers, find food in local ponds and, of course, use them for drinking water.

Rare and Endangered Species

No nationally threatened species have been observed on the Lake Shelbyville project, but one mammal and two species of birds could occasionally occur. The mammal, the Indiana bat (Myotis sodalis) could occur commonly as a summer resident. Unfortunately, its summer habitats are not well known, but it is thought that it may roost in trees. It is certainly not a winter resident due to the absence of limestone caves.

Both the Southern bald eagle (Haliaeetus l. leucocephalus) and Peregrine falcon (Falco peregrinus anatum) have been reported in southern Illinois, but they are not known in the Shelbyville area.

Wildlife Resources

Wildlife species of recreational importance are those that are hunted for recreation and those that are observed for recreation. Very few species of vertebrates are not included in these categories. Lake Shelbyville, therefore, can be considered an important wildlife area as contrasted to the surrounding cornfields which are unusable by most vertebrate species and have been characterized as "a great corn desert" (Smith, 1961).

In the wildlife areas leased to the Illinois Department of Conservation, "The primary objective in management . . . is to provide quality hunting and fishing . . . and . . . principal efforts are therefore expended toward maintaining and managing upland, forest, migratory and big game . . . resources" (Cottingham, 1973).

During the 1972 season, game hunting in the Department of Conservation wildlife lands was most successful for (in descending order or numbers killed) cottontail, bobwhite, pheasant, Eastern fox squirrel, Eastern gray squirrel, woodcock and mourning dove. Waterfowl kills (in descending order of numbers killed) included mallard, woodduck, green-winged teal, blue-winged teal, widgeon, pintail, scaup, gadwall, ring-necked duck, black duck and shoveller (Cottingham, 1973).

Most remaining federal lands, while not as intensively managed, are open for hunting as well. Little is known of either hunter usage, or species composition of kills, but due to lack of waterfowl habitat, except in the Conservation Department wildlife lands, it can be assumed that upland and forest game made up the majority of the harvest. Deer hunting is allowed on State and Corps-managed lands.

Fish Resources

Commercial Fishing in the Basin*

Only the lower portions of the river have been opened to commercial fishing on an intermittent basis. At present, only the main stream segment in Fayette County is commercially fished.** The present dollar value of this fishery is not accurately known, but past estimates on other portions of the river indicate only a minor contribution to the overall financial worth of the total commercial fishery in the state. In 1922, Kaskaskia River fishermen marketed $3,720 of fisheries products while in 1950, the total worth was estimated at $2,127 (Luce, 1933; Starrett and Parr, 1950). More recent dollar values of the Kaskaskia River commercial fishery are not available.

Sport Fishing***

Sport fishing at Lake Shelbyville could only be rated as fair for 1973 spring and summer months. The poor gizzard shad spawning success in 1972 left the predator fish population (the primary sport species) in poor shape. As a result, angling success was also poor. Walleye provided the best spring fishery, followed by small bass and crappies. The tremendous population of white bass apparently died during the winter months, due to their poor body condition and a very limited food base. Angling success did not improve until early September. The resurgence in fishing is directly related to the tremendous spawn of gizzard shad produced during the year. Anglers began catching small crappie, blue-gill, walleye and largemouth bass by early fall. Fishing remained good for bass and crappie until late October.

The majority of the largemouth bass sampled in 1973 were small. The population does contain a few large individual largemouth bass up to four pounds. With the good spawn in 1973, this species appears to be recovering from the food shortage effects of 1972 and should provide some sport fishing in 1974. Smallmouth and white bass have had poor spawns but populations can probably be improved by careful management.

Crappies and bluegills are established in the lake and provide good fishing. Channel catfish, bullhead, carp and drum are expected to increase in both size and abundance.

Pestiferous Arthropods

Mosquitoes, ticks and chiggers are the arthropods most likely to cause discomfort to people using Lake Shelbyville's recreational facilities

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* From Bowman, 1974.

** Commercial fishing was allowed in Carlyle Lake in March and April, 1974.

*** From Fritz, 1973.

and wildlife management areas during the spring, summer and fall. Furthermore, mosquitoes and ticks can be disease carriers. The former may be vectors for malaria and St. Louis encephalitis, and the latter may infect their human hosts with Rocky Mountain spotted fever and tularemia.

Mosquitoes

Most mosquitoes breed in still, shallow water, preferring areas with an abundant cover of aquatic vegetation, a good food supply of humus or other organic matter on the bottom and micro-organisms floating on the surface (Mackenthun, 1969). The upper reaches of Lake Shelbyville, particularly the shallow backwaters and lateral embayments, provide such an environment for *Anopheles quadrimaculatus*, the malaria mosquito (U. S. Army Engineer District, St. Louis, 1961). *Culex pipiens*, the vector for St. Louis encephalitis, is seldom associated with impoundments and should not increase.

Floodwater mosquitoes are a major pest group in Illinois, but do not carry disease. They should increase when pool levels are high during the spring and early summer, and may be a nuisance to lake visitors. Contrary to expectations, mosquitoes have not become more common in the vicinity of Lake Shelbyville during its three years of operation. Visitors have not complained about them, and insecticides have not been used to control them. Visitor areas are well drained, and there is little standing water to provide mosquito breeding grounds. The Wildlife Management Areas are most heavily utilized during hunting seasons after frosts have killed the mosquitoes.

Ticks

Two species of Illinois ticks are vectors of diseases that can be transmitted to man. The wood tick, *Dermacentor variablis*, may transmit Rocky Mountain spotted fever. This tick is particularly abundant in spring and early summer. It is found in brushy places and at the edges of woods, especially along animal trails. The rabbit tick, *Haemaphysalis leporispalustris*, common in spring and summer, is the vector for tularema, (Stannard, 1967a).

Several other species of tick that do not transmit disease also bite man, causing skin irritation that may persist for weeks. They, too, are found in brushy places and the edges of woods during the frost-free season.

Ticks are common in the vicinity of Lake Shelbyville, but no more so than in the rest of the state. It is not possible to control the ubiquitous tick without killing beneficial insects.

Chiggers

Two species of these mites bite man, but neither carry disease, They do, however, produce extremely irritating skin lesions. Chiggers are active from late May to late September in the Lake Shelbyville area, occurring along

fence rows, brushy places, weedy hillsides and along the edges of woods (Stannard, 1967b).

Visitors have not complained about chiggers.

CULTURAL ELEMENTS

General

Lake Shelbyville is located in the center of Illinois farmland. Because of the size and formation of the lake, the impacted area encompasses two counties, Shelby and Moultrie. The Illinois Department of Business and Economic Development locates Shelby County in the Decatur Region for Economic Data Presentation, and Moultrie County in the Champaign Region. Neither county is located in a Standard Metropolitan Statistical Area of the U. S. Census Bureau and, with the exception of the Central Illinois Regional Law Enforcement Commission, neither county belongs to a regional planning commission.

Population

Growth and Distribution

Although both counties are primarily agricultural, approximately 44 percent of those living in Shelby County and 50 percent of those living in Moultrie County in 1970 resided in a town rather than on a farm. Shelby County, with an area of 769 square miles, has a lower density of people per square mile (293 persons per square mile) than Moultrie County (384 persons per square mile) which has an area of 345 square miles. While a high percentage of people in both counties live in towns, the 1969 Census of Agriculture indicated that 90.8 percent of the land in Shelby County was in farms and 89.3 percent of the land in Moultrie County was in farms.

Between 1960 and 1970, the population of both counties decreased. Since 1970, however, the population has increased slightly. Shelby County which had a 1970 population of 22,589 increased 0.5 percent to 22,700 in 1972. Moultrie County which had a 1970 population of 13,263 returned to its 1960 population of 13,600, thereby negating any decrease which occurred between 1960 and 1970. Most of Moultrie County's population change has been in the town of Sullivan, the county seat, which grew from 3,900 in 1960 to 4,100 in 1970. Shelbyville, on the other hand, lost population during the same 10-year period. Population projections made by the Illinois Department of Business and Economic Development, anticipate slight declines in the population of both counties by 1980, with Shelby County leveling at 22,000 and Moultrie County at 13,000 persons. These population projections are based on past and present tendencies of rural populations to shift toward urban centers of trade and industrial activities such as Decatur and Champaign. Because of the location of some industry in Sullivan, the population can be expected to increase to about 4,500 by 1980 in contrast to the county as a whole.

Population Characteristics

In terms of population characteristics, both counties have a similar composition, and both reflect the nation as a whole, except for the percentage of persons over 65 years of age. The median age of persons in Shelby County was 32.4 years; the median age of persons in Moultrie County

was 31.6 years. Both counties showed slightly more than 34 percent of the population as being under 18 years of age. Shelby County had a greater proportion of elderly persons (20.4 percent) than Moultrie County (13.2 percent), and both counties had more elderly in the population than the national average of 10.1 percent. This is reflective of the farming population in both counties which tends to be older than the non-farming population. The 1969 Census of Agriculture indicated the median age of farm operators in Shelby and Moultrie Counties was around 50 years of age.

Sociological Characteristics

Shelby and Moultrie Counties are well established and show generally stable socio-economic patterns of activity. The 1960 Census indicated that at least two-thirds of the housing units in both counties were built prior to 1929. Reflecting the overall stability of the area, both counties had a homeownership rate of 67 percent in 1970.

Educational characteristics for both counties reflect a previous commitment to farming as a way of life and limited emphasis on a high school diploma. The median school years completed in Shelby County in 1970 was 10.8; the median school years completed in Moultrie County was 11.5 years; compared to 12.1 years for the state as a whole. Educational achievement was fairly even among males and females. Of those persons 25 years and over in Shelby County, 45 percent had completed high school; 44.5 of the those 25 years and over in Moultrie County had completed high school.

Local Economy and Employment

While most of the land area in Shelby and Moultrie Counties is used for farming, almost 90 percent of the civilian labor force in both counties were employed by some industry other than farming in 1970.

Employment Characteristics

Reflecting the decline in total population, the total employed in Shelby County decreased from 7,895 in 1960 to 7,626 in 1970. Unemployment in 1970 was 6.2 percent in Shelby County, reflecting particularly upon Shelbyville which experienced a significant loss of jobs due to the closing of the Oliver Plant in 1969. Since 1970, however, employement has been increasing in Shelby County and the unemployement rate had declined to 5.1 percent of the work force in 1972 and an even lower 3.2 percent in 1973 (Illinois Department of Labor).

Moultrie County increased in the number employed in 1960; 4,989 to 5,210 in 1970. The 1970 Census indicated an unemployement rate of less than three percent in 1970.

Between 1960 and 1970, no major change occurred in the distribution of occupations amongst the work force, with the exception of farmers and farm workers. The decrease in this category is proportionate to the decrease in number of farms during the same time period.

Income Characteristics

Employment sources in Shelby and Moultrie Counties are limited and, as a result, approximately one-third of the workers in both counties work outside their county of residence. Many can be expected to work in Decatur and possibly Mattoon, where employment sources are more abundant. Compared to the state, the median income of families in both counties does not reflect a favorable standard of living, especially in Shelby County which ranked $1,641 below the national median family income in 1969 and $3,167 per annum below the state average. However, because the Census was taken during a somewhat depressed economic period, particularly in Shelbyville, it is reasonable to consider that there has been some increase inthe income of Shelby County families since 1970.

Moultrie County also fell below the state and national median family income, being $8,987 as opposed to $9,433 for the national and $10,959 for Illinois.

Retail Activity

Sales activity in the commercial centers of both counties has increased considerably in the last 10 years, even considering increases in the cost of living. (See Table II-3.) Sales tax comparisons of 1964, 1968, 1972 and 1973 for the towns of Shelbyville and Sullivan indicate that tax receipts between 1964 and 1973 have more than doubled, particularly for the month of June which is representative of the peak tourist season. Two factors should be used to interpret the figures for an understanding of real increase, however.

The first factor to be considered is that of inflation. Using the Consumer Price Index as a guide, with 1967 representing 100 percent, the 1972 dollar is equal to 125.3 percent of the 1967 constant dollar. Real increases, as opposed to inflation, are shown in Table II-4, using the 1967 constant dollar and comparing 1964 to 1972 sales tax receipts. The real increase in sales tax receipts between June of 1964 and June of 1972 for Sullivan was 142 percent, and for the same two months in Shelbyville was 110 percent.

The increase represents an increase in sales of existing shops and businesses for the most part. Commercial expansion in terms of new business in both towns has been limited, although some new shops and businesses, especially food shops and restaurants, have opened in Shelbyville and Sullivan in the last three years.

Agricultural Trends

The average size of farms has increased in Shelby and Moultrie Counties between 1964 and 1972 approximately the same amount (Shelby County by a factor of 1.21; Moultrie County by a factor of 1.24). The average size of farms is about 50 acres larger in Moultrie County, probably reflecting the greater emphasis on row crops and better soil. The average value per acre

Table II-3

SALES TAX RECEIPTS
1964, 1968, 1972, 1973

Shelbyville and Sullivan, Illinois

	1964			1968		
	Feb.	June	Nov.	Feb.	June	Nov.
Shelbyville	$ 3,020	$ 5,231	$ 5,159	$ 7,658	$ 9,101	$ 8,147
Sullivan	$ 2,045	$ 4,020	$ 2,864	$ 4,142	$ 7,035	$ 5,984

	1972			1973		
	Feb.	June	Nov.	Feb.	June	Oct.
Shelbyville	$11,185	$13,853	$11,769	$12,943	$17,304	
Sullivan	$ 8,812	$12,183	$ 9,844	$ 9,548	$12,779	$ 9,984

Source: City Clerks, Shelbyville and Sullivan.

Table II-4

SALES TAX RECEIPTS
IN CURRENT AND CONSTANT DOLLARS
1964 and 1972

Shelbyville and Sullivan, Illinois

	1964			1972		
	Feb.	June	Nov.	Feb.	June	Nov.
Shelbyville:						
Current Dollars*	3,020	5,231	5,159	11,185	13,853	11,769
Constant Dollars	3,251	5,631	5,553	8,927	11,056	9,392
Sullivan:						
Current Dollars**	2,054	4,020	2,864	8,812	12,182	9,844
Constant Dollars	2,211	4,327	3,082	7,034	9,723	7,856

Source: City Clerks, Shelbyville and Sullivan.

*NOTE: Current dollar is 92.9 percent of 1967 constant dollar for 64.
**NOTE: Current dollar is 125.0 percent of 1967 constant dollar for 72.

has also increased in both counties, but by a greater amount (1.41 times) in Shelby County than in Moultrie County (1.29 times).

Farm sales have also increased in both counties. However, the average sales per farm have increased by a greater amount in Shelby County (1.41 times) than in Moultrie County (1.22 times). This is partially explained by analyzing total crop and total livestock sales. Crop sales increased in both counties (Moultrie County - 1.13 and Shelby County - 1.29) for this period. However, in Moultrie County, livestock sales decreased (-87.9 percent) and increased in Shelby County (1.22 percent).

Farm production expenses have increased in both counties for the period 1964 to 1969. Part of this increase is due to inflation. However, increases in gas and oil, fertilizer, seed costs, hired labor and custom work do seem to be significant. This also points to the increasing reliance on grain crops for farm income. For the year 1969, the average farm expenses were $12,356.24 for Moultrie County and $12,916.70 for Shelby County.

Average crop yields are higher in Shelby and Moultrie Counties than the state averages. There has also been a slight decrease of corn acreages over the last 10 years and an increase in soybean acreages. Hay and wheat acreages have also decreased during this period. This reflects the increased emphasis on soybeans during these years as a major economic crop and the concurrent rise in soybean prices during these years.

Archeology and History

Archeological Sites

Results of archeological excavations and research conducted prior to filling of the lake, indicate that the earliest occupation of the Lake Shelbyville area dates from the Archaic, about 5000 B.C. Known Archaic sites in the area are small and are scattered along the bluffs as far north as the lake's upper limits around Cooks Mill. However, most sites were principally on the Kaskaskia, either above or below its junction with the Okaw River. Archaic sites are also found on various ridges throughout the surrounding prairie which, at one time, were most likely forested and provided a suitable habitat for hunting and gathering.

In the river valley, three sites were found containing material of the Havana Cultural Tradition; the Foltz, Jasper Newman and Sweet Bee sites. These were on the Okaw and Kaskaskia Rivers and were excavated and reported by Gardner in 1969. Evidence of the Mississippian Tradition, which dates back 1,000 years, was found in several places along the Okaw River, but not along the bluffs or on the prairies.

Extensive archeological research was conducted by the University of Illinois under the auspices of the Corps of Engineers, prior to the filling of Lake Shelbyville. The results of this research were valuable to archeological knowledge of the Midwest. The lake was filled after conclusive

results of the 1963-67 archeological digging had been formulated. Further research in the area is hampered somewhat by extensive cultivation of the surrounding prairies.

History of Area

The recorded history of what is today known as Shelby and Moultrie Counties is an integral part of the French and English settlement of the Kaskaskia Valley and the entire Illinois Country. As early as 1650, French missionaries began their attempts to convert tribes of the Illinois Indians in the upper Kaskaskia Valley. The missionaries were soon followed by farmers who settled the vast Illinois prairie.

In 1722, Illinois became a military district of Louisiana with a court of civil and criminal jurisdiction. However, by 1763, the Kaskaskia Valley came under British control and, while the British added few in terms of population, the regime was most unpopular. As a consequence, many of the original French settlers left the Kaskaskia Valley and headed west across the Mississippi River. By 1779, the American migration began to appear in the valley and most residents of the area today are direct descendants of this migration. Settlement of the Upper Kaskaskia Valley remained sparse throughout the early 1800's, and almost all the valley was within the jurisdiction of St. Clair County. The current political subdivisions of the state began to unfold in the 1820's with Shelby County being formed in 1827. At that time, Shelby County included Moultrie County which did not become a separate county until 1843 (Pease, 1937).

By the middle nineteenth century, the Kaskaskia Valley had few members of the Kickapoo Indian Tribe remaining, and most of the prairie was cultivated. Recent history of the area is closely tied to the life of Abraham Lincoln who visited the Courthouse in Shelbyville often during his early political career. The first of Lincoln's famous debates took place on the steps of the Courthouse in the summer of 1855 (Chamber of Commerce, 1972).

Another important event in the area's recent history was the opening of the Lithia Springs Chautauqua in 1892. The Chautauqua, so named from the Seneca Indian word meaning assembly lasting several days, for educational and recreational purposes, was begun at Lithia Springs by the Reverend Jasper L. Douthit, whose father owned considerable land in the valley. The Springs were an important part of the Chautauqua because they contained a caustic mineral called lithia which many believed to have healing powers. The Chautauqua proved to be a major attraction to the famous and Lithia became a tourist town. Today, however, Lithia Springs shows none of its former history, with exception of the Springs which are still active.

There is no property or structure within the lake area which has been designated as being of historical significance by listing in the National Register of Historic Places, as printed in the Federal Register, February 28, 1973. No properties have been designated as historic places in any subsequent updating of the list as of March 5, 1974.

No potential National Register properties (those of historical, archeological, architectural or cultural significance) will be adversely affected by any present or proposed Lake Shelbyville operation and maintenance procedures.

Outdoor Recreation

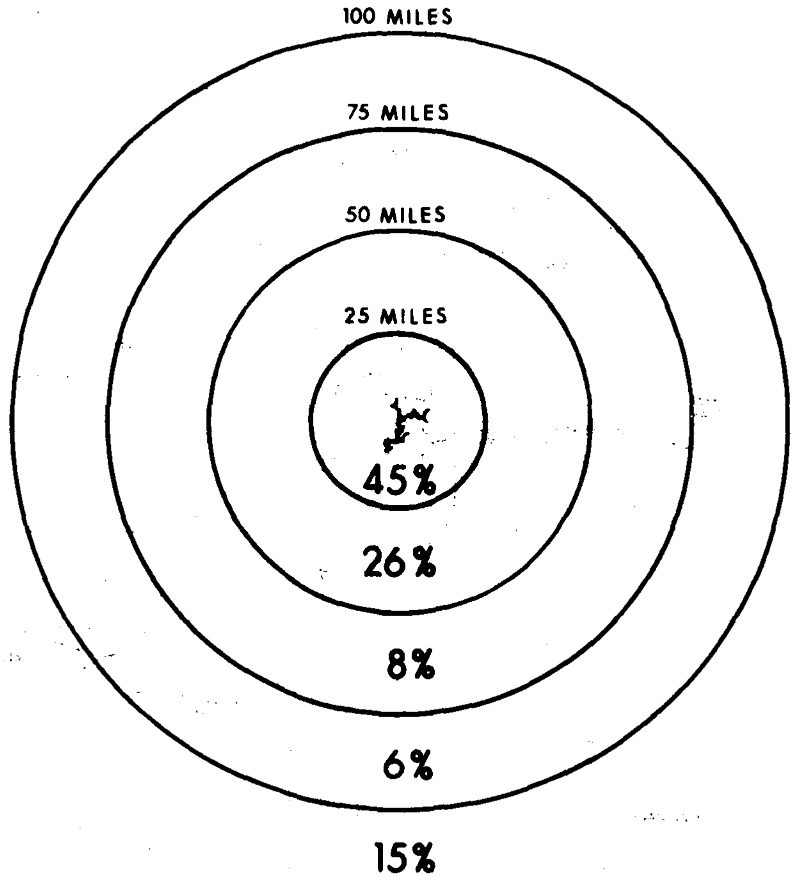
Lake Shelbyville serves as a multiple use recreational facility, not only for the residents of Shelby and Moultrie Counties, but for a large regional area. According to 1973 visitor surveys, an estimated 45 percent of all visitors travel less than 25 miles to the project; 26 percent travel from 26 to 50 miles, eight percent from 51 to 75 miles, six percent from 76 to 100 miles, with 15 percent travelling more than 100 miles. Seventy percent of all visitors travel less than 50 miles to the project. (See Plate II-15.) While this represents a high use level within a relatively small service area, it is comparable to the travel use pattern established at Carlyle and Rend Lakes.

Regional Supply and Demand

The 1972 Illinois Statewide Comprehensive Outdoor Recreation Plan estimates existing recreation facilities and deficiencies for 1970, 1975 and 1985. These estimates are provided on both a state and regional level. Moultrie, Shelby and 14 other counties form Region 3B. This region is made up of approximately 10,586 square miles and contained 631,567 people in 1970, accounting for 6.8 percent of the state's population. As of 1970, 58,053 acres of recreational land existed regionally. A comparison of the 1970 recreation supply and current Lake Shelbyville facilities reflects the project's potential impact on a regional scale. The Shelbyville project makes up 40 percent of all regional recreation land. The lake provides 33 percent of all regional camping facilities, six percent of all picnic sites, 2.7 percent of all swimming beaches or pools, and 20 percent of all regional fishing and boating opportunity.

Future recreation demands will increase faster than population growth because of shorter work weeks, more leisure time, greater mobility, and higher incomes. Projected recreation needs must reflect both changing attitudes and population growth. Based upon such an approach, the Illinois Statewide Comprehensive Outdoor Recreation Plan predicts that Region 3B will experience a substantial demand increase for all forms of water oriented activities. Camping, nature study and hiking lead the list of land activities. By 1975 greatly increased facilities will be needed to satisfy these demands. The following facilities are estimated to be needed:

Water skiing	43,000 additional acres
Small boating	15,000 additional acres
Fishing	38,000 additional acres
Power boating	20,000 additional acres
Sail boating	8,000 additional acres
Swimming	142 additional pools or beaches
Camping	2,215 additional acres
Hunting	96,000 additional acres



6% PERCENT OF TOTAL VISITORS TO LAKE SHELBYVILLE BY ORIGIN

ORIGINS OF VISITORS

Picnicking is the only activity which has an over-supply of facilities. By 1975, 5,002 tables will be needed. There currently exists 6,622 tables, a 25 percent over-supply.

Shelby and Moultrie Counties

Existing public recreation facilities within Moultrie and Shelby Counties are limited primarily to school playgrounds and small municipal parks, and a number of semi-public camps. The only exception is Wyman Park (45 acres) in Sullivan, which contains a six-acre swimming and fishing lake.

An inventory by the Soil Conservation Service in 1974 showed the following private recreational facilities:

	Shelby County	Moultrie County
Private camps	15	4
Marinas	1	2
Private hunting clubs	7	1
Nine-hold golf courses	2	2
Horse riding stables	-	-
Fishing clubs	11	2
Swimming pools	2	2

Land Use

Past Land Use Development

Patterns of land use in Shelby and Moultrie Counties reflect a basically agrarian way of life which has dominated the area since the early nineteenth century. Towns have formed either as market places around railroad junctions or centers of government. Roads served the primary purpose of enabling a farmer to get his goods to market. Recent trends toward mechanized farming and larger farms, however, have resulted in an expansion of towns, and the towns in turn have become more eognizant of the need for industry as an employment source. As a result, Shelbyville and Sullivan have passed from their farmtown status to independent centers of commercial and industrial activity.

As the options and stability of the non-farming population have increased, more non-farm residences have appeared, dispersed throughout the counties. While non-farm residences are no longer restricted to the towns, most are still centered around them. Agriculture remains the dominant use of land in both counties, although recent developments are beginning to change the traditional agrarian pattern. Most important has been the influence of Lake Shelbyville in attracting non-agricultural land uses.

Existing Land Use

In 1964, Shelby and Moultrie Counties were almost entirely agricultural with the exception of scattered incorporated areas. This pattern remained

reasonably intact until the construction of Lake Shelbyville, which removed thousands of acres from agricultural use. The most significant residential development has occurred since 1970, with the platting of 18 separate subdivisions adjacent to the federal lands around the lake. To date, few actually contain dwelling units or improvements, but all have been residentially zoned and range in size from four to 170 lots. The subdivision represent a major change in the development pattern with residential construction being oriented toward the lake, rather than the surrounding towns. (See Plate II-16.)

The second major change in land use is the public access to the lake shoreline. Considerable land is currently developed for either recreational or conservation use. In total, 34,408 acres in Shelby and Moultrie Counties have been changed from primarily agricultural use to that of primarily recreational.

New commercial construction since 1970 has also resulted in some changes in land use to allow for recreation-oriented commercial activities. The principal businesses are bait shops and marinas. (See Plate II-17.) There has also been new public and industrial construction in the towns around the lake, particularly Shelbyville, but land use changes in these categories have not been significant in terms of size.

Future Land Use

Future land use in Shelby and Moultrie Counties will be determined to a great extent by the extent of the use of Lake Shelbyville as a major regional recreation area. Land use forecasts made by both counties in 1974 indicated the expected growth of residential development around the lake and a subsequent growth of the nearby towns, particularly Shelbyville and Sullivan. (See Plate II-18.) Judging from the limited amount of growth that has taken place in the last 10 years, however, such extensive growth appears unlikely, and possibly undesirable in terms of quality. The land use plans also exhibit a growing awareness in both counties of the value of conserving lands and limiting development in flood zones. Despite the projected urban growth and recreational facilities development, the major land use in terms of total acres in both counties is expected to remain primarily agricultural in the foreseeable future.

Roads

The state routes surrounding and leading into the area are Routes 16, 32, 121 and 128. Two Interstate Highways are located nearby. Route 57 at Mattoon is about 25 miles east of the lake and Route 70 is approximately 30 miles south. A new freeway is proposed connecting Decatur and Salem, which will run north and south through Shelby County, approximately 10 miles west of the lake.

The local roads, including some of the state routes serving the area, have not been able to meet the requirements of the increased traffic generated by the opening of Lake Shelbyville. The state route deficiencies are primarily in width. Traffic on the county and township roads presents a

LAND USE 1974

LEGEND

- AGRICULTURAL & OTHER LAND
- FARM UNITS INCLUDING FARM HOUSES
- URBAN AND NON-FARM RESIDENTIAL
- COMMERCIAL
- PUBLIC AND SEMI-PUBLIC LANDS
- INDUSTRIAL
- ▲ AIRPORT
- △ LANDING FIELD

SOURCES AERIAL PHOTOGRAPHS JANUARY 1974
GENERAL HIGHWAY MAP
SHELBY COUNTY ILLINOIS
GENERAL HIGHWAY MAP
MOULTRIE COUNTY ILLINOIS

PLATE II-16

2

61
150
70
12
7
4
3
35
13
19
6
6
16
32
26

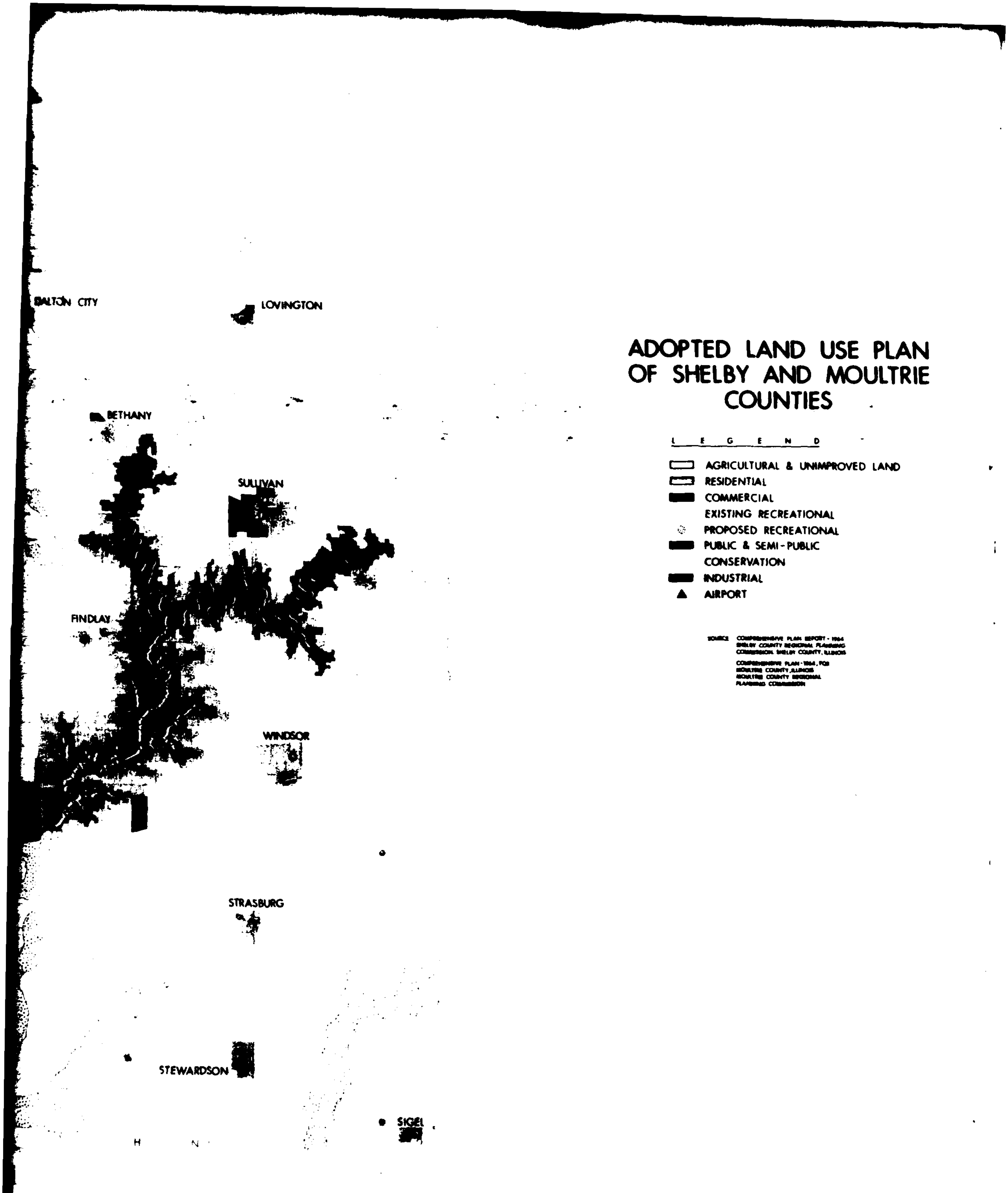
NEW CONSTRUCTION
1971-1974

- ● RESIDENTIAL UNIT
- ■ PLATTED SUBDIVISION (NUMBER OF LOTS)
- RECREATION ORIENTED COMMERCIAL
- NON-RECREATION COMMERCIAL
- ▲ MARINA

PLATE II-17

2


DALTON CITY
LOVINGTON
BETHANY
MOWEAQUA
SULLIVAN
FINDLAY
WINDSOR
SHELBYVILLE
STRASBURG
OCONEE
COWDEN
STEWARDSON
HERRICK


ADOPTED LAND USE PLAN OF SHELBY AND MOULTRIE COUNTIES
LEGEND
AGRICULTURAL & UNIMPROVED LAND
RESIDENTIAL
COMMERCIAL
EXISTING RECREATIONAL
PROPOSED RECREATIONAL
PUBLIC & SEMI-PUBLIC
CONSERVATION
INDUSTRIAL
AIRPORT
DALTON CITY
LOVINGTON
BETHANY
SULLIVAN
FINDLAY
WINDSOR
STRASBURG
STEWARDSON
SIGEL

2

PLATE II-18

more serious problem. For the most part, these roads do not have adequate base to support the type or volume of visitor traffic to the lake. The former maintenance practices of minor grading, adding of aggregate and bituminous or road oil surface treatment over these roads with inadequate base, produce only temporary improvements, usually lasting less than one season.

Improvements are being made as funds become available. However, the available funds do not permit a program of the size needed. The budget requirements are not only for the cost of road surface on new base, but also to correct unsafe alignment, including both horizontal and vertical curves. (See Plate I-6.)

Railroads

At present, the Norfolk and Western, Penn Central, Illinois Central Gulf, and Chicago and Eastern Illinois Railroads have tracks within the Lake Shelbyville area (Shelby and Moultrie Counties). However, according to a report entitled "Rail Service in Midwest and Northwest Regions" by the Secretary, U. S. Department of Transportation, the only railroad near the lake that is not declared "excess" is the Chicago and Eastern Illinois line going from Shelbyville through Findlay and through Sullivan to the northeast. All other rail lines in the area are proposed to be eliminated in this program.

Aesthetics

Visual aesthetics of Lake Shelbyville have been evaluated on Plate II-19, using a methodology established by Fines for landscape and land form evaluation (Fines, 1967). The aesthetic values define the extent to which the are is visually attractive in terms of various landscape features and the degree to which they occur. Because of the contrast in topography between the lake area and what is normally Illinois prairie land, the lake overall has a rather pleasant appearance. Extensive tree cover in some stretches along the shoreline and steep banks distinguished some areas as more attractive than others. (See Plate II-19.)

While the lake area is generally pleasant, with moderate forest cover, intermixed agriculture, moderate topographic relief and landform variety, some areas have been adversely affected by human activities and erosion along the banks of the lake. These areas (see Plate II-20) are unsightly, being virtually devoid of natural vegetation and, in some cases, having visually unattractive man-made developments.

Health

Health facilities and services in Shelby and Moultrie Counties are typical of most predominantly rural areas. The number of doctors in both counties is limited, but not critical. Both Shelbyville and Sullivan have

AESTHETIC EVALUATION

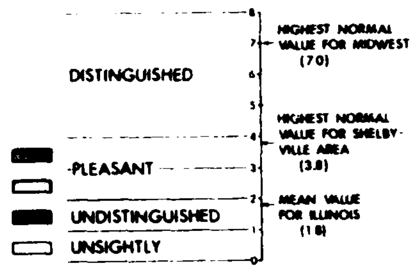
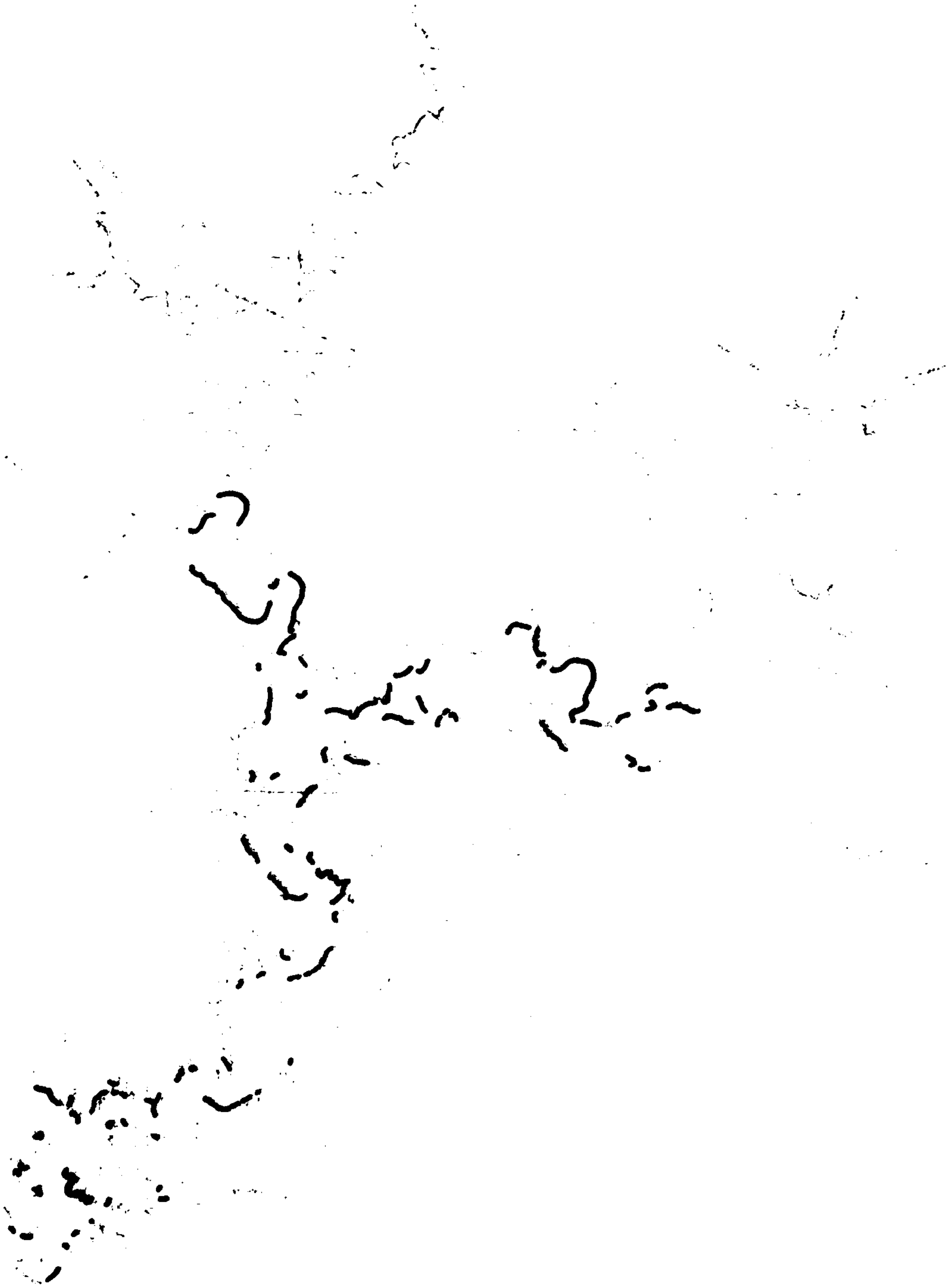
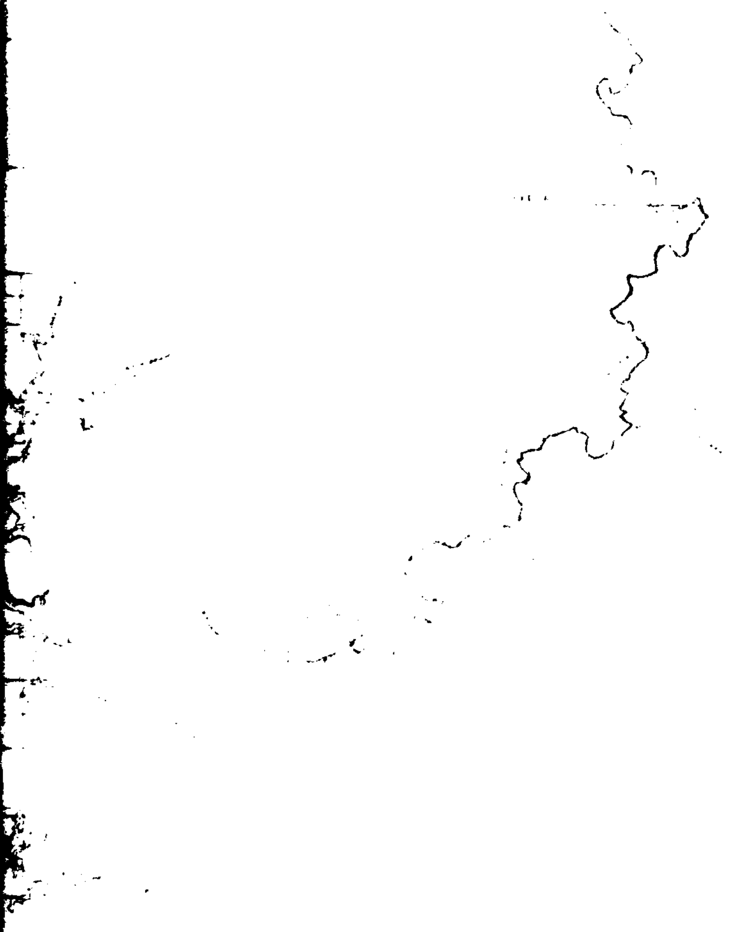


PLATE II-19





SHORELINE EROSION

SITES OF SHORELINE EROSION

2

PLATE II-20

ambulance services offered by a local funeral parlor in both cases. One additional ambulance service is located north of Sullivan in Moultrie County.

There is a 100-bed hospital in Shelbyville. The city's non-profit, non-tax supported hospital has recently added a cardiac ward and an adjoining $300,000 Medical Center. Senior citizens are served by a number of nursing care facilities in both counties.

In response to increasing accident rates on the roads and associated with Lake Shelbyville, both Sullivan and Shelbyville have formed voluntary rescue squads which are tuned into police radio broadcasts. These squads help reduce the load of local and county police by responding to emergency medical and rescue calls.

In terms of mental health, both county seats have mental health and retardation centers, although emergency mental health (crisis center) facilities are limited. Serious physical and mental health problems are handled either in Mattoon or Decatur, both of which are a little over one-half hour drive from either Shelbyville or Sullivan.

Planning and Zoning

Shelby and Moultrie Counties have both adopted comprehensive plans and participate in continuing planning efforts. The Moultrie County Zoning Ordinance became effective in September of 1965. The ordinance is a modern, comprehensive ordinance and provides a basis for sound land use controls throughout the unincorporated areas of the county. The ordinance establishes 13 zoning districts, providing for rural development as well as urban residential, commercial and industrial, and also contains a mobile home district and a resort commercial district.

Appropriate land uses are allowed in the various districts and provisions are made for special use regulation. The ordinance establishes yard and area requirements and the usual parking and off-street loading requirements, as well as provisions for non-conforming uses and large-scale developments.

The Shelby County Ordinance creates 12 districts and is very similar to the Moultrie County Ordinance, providing agricultural, the usual residential, commercial and industrial districts, as well as a lake residence and floodplain district. The ordinance establishes yard and area requirements and has adequate parking and off-street loading provisions. Provisions are also made for special uses and for non-conforming uses.

Moultrie County has a county planner and the Cities of Shelbyville and Sullivan have zoning administrators. However, the adopted Comprehensive Plans for Moultrie and Shelby Counties are 10 years old, and are in need of updating. Because the plans anticipated Lake Shelbyville, many zoning decisions are made on expectations rather than existing resources and markets. In this respect, revised Comprehensive Plans are in order, especially in light of the proliferation of independent subdivisions along the lake. While adequate Subdivision Regulations are available in both counties, the coordination of individual streets, sewer systems, etc., with the overall county systems, cannot be achieved without an update of planning efforts.

Public Safety

Crime Prevention

Lake Shelbyville is located in the Central Illinois Regional Law Enforcement Commission jurisdiction of the Illinois Law Enforcement Commission. The region includes Christian, Moultrie and Shelby Counties, and was formed in 1970. Subsequent to its formation, the CIRLEC compiled the Criminal Justice Plan 1970-1975, outlining existing criminal justice conditions in the three counties, and detailing a set of priorities for future improvement. In Shelby and Moultrie Counties, the most frequent arrests are of males between 19 and 30 for traffic violations. While 78 percent of the arrests in Moultrie County and 91 percent of the arrests in Shelby County are for traffic violations, alcohol and disorderly conduct, the bulk of crimes reported are theft, vandalism and burglary. Because of the land area and rural nature of both counties, arrests for these crimes are difficult. This is particularly true in light of the limited number of vehicles and personnel available in the counties. (See Table II-5.)

Table II-5

COUNTY POLICE PERSONNEL 1970-1974

Shelby and Moultrie Counties, Illinois

	1970	1971	1972	1973	1974
Shelby County	4	5	8	8	8
Moultrie County	6	8	11	11	9

Source: Moultrie County Regional Planning Commission Central Illinois Regional Commission of Law Enforcement.

More recent data from the Illinois Department of Law Enforcement indicates an increase in felonies between 1970 and 1971 for Shelby and Moultrie Counties, but violent crimes such as murder or rape remain infrequent. The bulk of felonies in both counties are as the Criminal Justice Plan indicated, burglary and larceny. (See Table II-6.)

Traffic Control

An increasingly significant amount of police time in Shelby and Moultrie Counties is spent in traffic patrol. As stated in the Criminal Justice Plan, 1970-1975, "violence, civil disorder, and racial confrontation have not occurred, nor are they likely, unless Lake Shelbyville attracts troublemakers along with peaceful citizens. Here, careful control, especially in zoning and traffic control, is most important" (p. 51). Increased personnel and patrol have resulted in substantial increases in the County Sheriff's Budget for both counties since 1970. (See Table II-7.)

Table II-6 (Part A)

PART I OFFENSES REPORTED FOR THE YEAR 1971

Moultrie and Shelby Counties, Illinois

	Total Part I Crime	1970 Crime Index*	1971 Crime Index	Change
Moultrie County	88	53	68	+ 28.3
Shelby County	201	127	162	+ 27.6

***Crime Index:** Murder and Nonnegligent Manslaughter, Rape, Robbery, Aggravated Assault, Burglary, Larceny $50 and Over, Auto Theft.

Table II-6 (Part B)

PART I OFFENSES REPORTED FOR THE YEAR 1971

Moultrie and Shelby Counties, Illinois

	Murder and Nonnegligent Manslaughter	Manslaughter by Negligence	Forcible Rape	Robbery	Aggravated Assault	Burglary Breaking or Entering	Larceny $50 and Over	Larceny Under $50	Auto Theft
Moultrie	0	0	0	0	3	40	12	20	13
Shelby	0	0	0	1		2	106	53	39

Source: Illinois Department of Law Enforcement Safety.

Table II-7

SHERIFF DEPARTMENT BUDGETS 1970-1974

Moultrie and Shelby Counties, Illinois

	1970	1971	1972	1973	1974
Moultrie County	$53,004	$65,650	$97,728	$97,725	$100,350
Shelby County	48,020	66,920	138,800	157,338	161,910

Source: Central Illinois Regional Commission for Law Enforcement.

Table II-8

TRAFFIC ACCIDENTS 1970-1974 (PROJECTED)

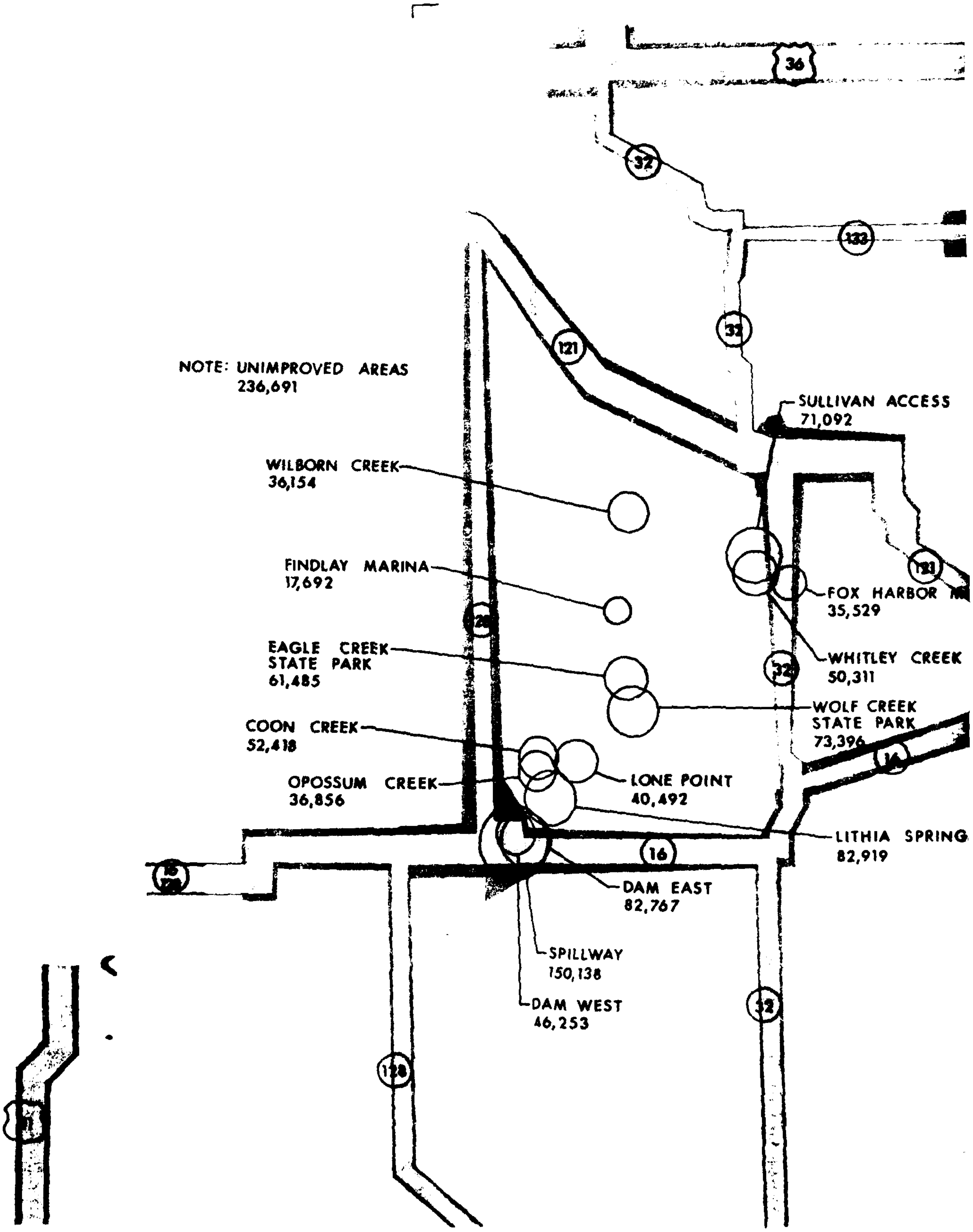
Moultrie and Shelby Counties, Illinois

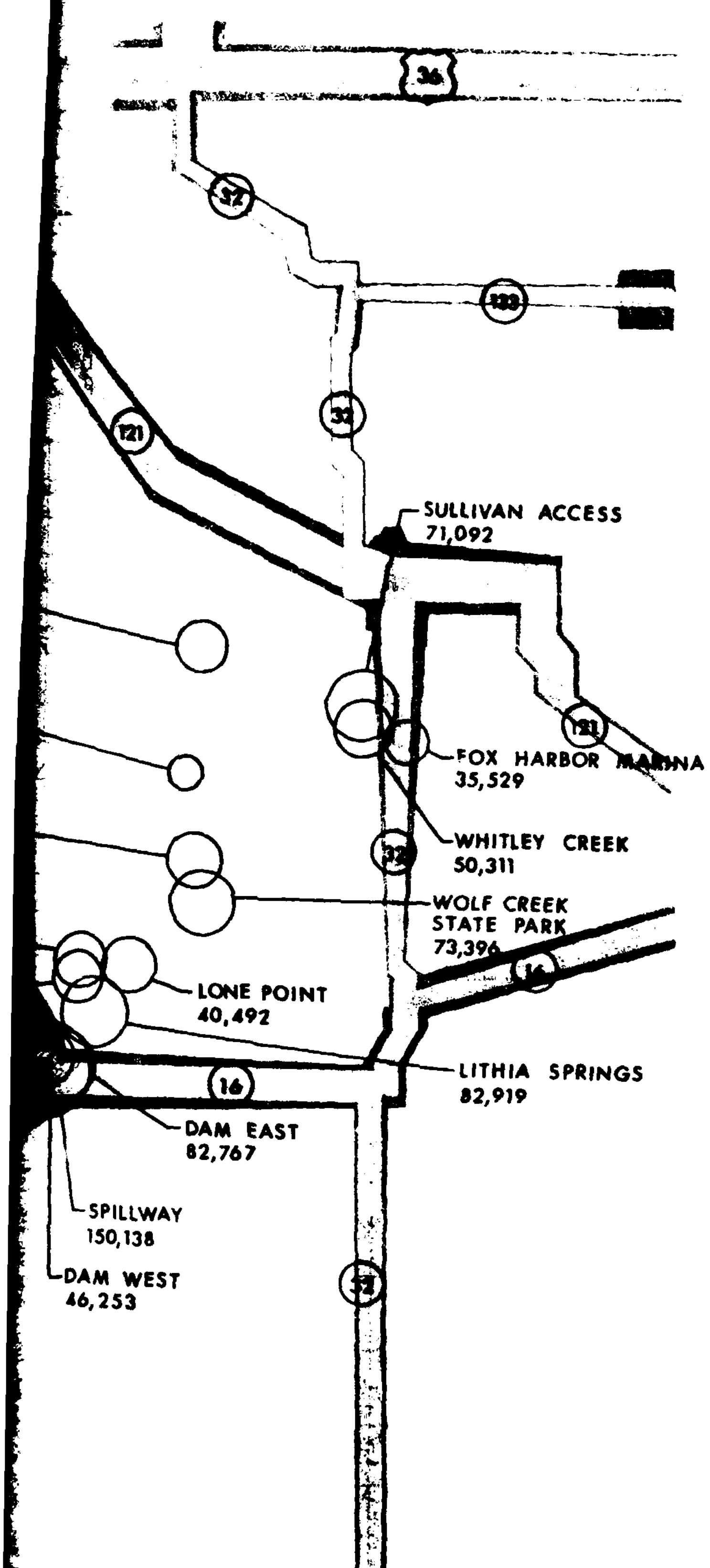
	1970	1971	1972	1973	1974*
Moultrie County	80	87	106	119	132
Shelby County	70	144	218	253	300

***Forecast,** Sheriff's Department.

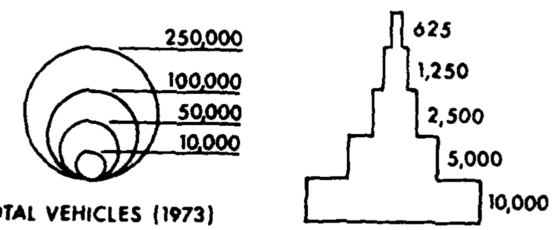
Source: Central Illinois Regional Commission for Law Endorcement.

While police expenditures have been increasing, so also have the number of traffic accidents, with Shelby County reporting twice as many traffic accidents as Moultrie County in 1973. (See Table II-8.) Between 1970 and 1971, traffic accidents increased by 95 percent in Shelby County and again by 51 percent in 1972 and 16 percent in 1973. Moultrie County, however, has experienced less of an increase, averaging out to a 50 percent increase between 1970 and 1973. Such an increase in traffic accidents reflects the impact of increased traffic flow through both counties, as shown in Plate II-21. Many of the accidents occur as a result of heavy use of often poorly surfaced and narrow roads, by visitors to Lake Shelbyville.


NOTE: UNIMPROVED AREAS
236,691
SULLIVAN ACCESS
71,092
WILBORN CREEK
36,154
FINDLAY MARINA
17,692
FOX HARBOR
35,529
EAGLE CREEK
STATE PARK
61,485
WHITLEY CREEK
50,311
WOLF CREEK
STATE PARK
73,396
COON CREEK
52,418
OPOSSUM CREEK
36,856
LONE POINT
40,492
LITHIA SPRING
82,919
DAM EAST
82,767
SPILLWAY
150,138
DAM WEST
46,253
36
32
132
121
128
16
32



TRAFFIC VOLUMES 1963 & 1973



TOTAL VEHICLES (1973)
TO PUBLIC ACCESS AREA

VEHICULAR SCALE
AVERAGE DAILY TRAFFIC

1963 TRAFFIC VOLUMES
1973 TRAFFIC VOLUMES
U.S. ROUTE
STATE ROUTE

SOURCES: TRAFFIC MAPS, 1963, 1973 STATE OF ILLINOIS DIVISION OF HIGHWAYS

RECREATIONAL VISITATION DATA FROM U.S. ARMY ENGINEER DISTRICT, ST. LOUIS CORPS OF ENGINEERS LMV FORM 264

PLATE II-21

2

PART III

ENVIRONMENTAL IMPACT OF OPERATION AND MAINTENANCE ACTIVITIES

ENVIRONMENTAL IMPACT OF OPERATION AND MAINTENANCE ACTIVITIES

As of 1 January 1974, operation and maintenance activities at Lake Shelbyville had been carried on for 42 months. Two of the three full years of experience had had normal rainfall; one (1973) had been unusually wet. For a facility of the size and magnitude of Lake Shelbyville, designed for 100 years of service, this is a very short time. It takes several years for a major recreation facility to "catch on". Investors prefer to rely on experience and not speculation. Impacts are difficult to discern and to measure because of this, and particularly when the impact of operation and maintenance activities is overwhelmed by the quite recent impact caused by the construction of the dam and the filling of the lake.

Lake Shelbyville is part of a comprehensive program for the Kaskaskia River, a program that has not been completed. With no drouth periods in the experience, and with navigation facilities on the lower Kaskaskia River yet to be completed, the facility has not been called upon to supplement downstream flows for either the Kaskaskia or the Mississippi. Potential adverse environmental circumstances resulting from low lake levels are yet to be encountered.

On balance, the project has contributed significantly to the environment. It has provided a huge badly needed recreation facility of extraordinary beauty in a part of the nation desperately in need of it. Its operation has reduced flood levels downstream. The social and economic environment of adjacent communities has been considerably enhanced. Appraisal of these impacts is of assistance in determining the optimum operation and maintenance practices. Repetition of the appraisal in another five to ten years will be more meaningful as it can be based upon a greater experience record.

Impact on Local Development

The major impact of the operation and maintenance of Lake Shelbyville as a significant recreation attraction is the positive effect on local community spirit. Somewhat less of an impact is felt in the local economy. Virtually no impact is evidenced on local property values to date.

Community

Most important to the surrounding communities is the operation of Lake Shelbyville for recreation purposes, including fishing, hunting and sightseeing, which are enhanced by fish, wildlife and forest management. Operation of the lake as a visitor attraction has had a positive psychological effect, encouraging a greater community awareness and acceptance of responsibility. While this is difficult to quantify, the adoption of planning and zoning in Shelby and Moultrie Counties is a good example of an awareness previously lacking. Other improvements have been made such as the water systems installed by Sullivan and Shelby County to serve the areas near the lake.

Road improvements, off-street parking, improved appearance, sewer systems, all are evidence of an increased community interest which local officials and business leaders attribute to Lake Shelbyville.

On the county level, however, the manner in which Lake Shelbyville is operated tends to be more significant in Moultrie County activities, although Sullivan is somewhat independent of the lake operations. Shelby County, on the other hand, is much larger with a significantly less proportionate land area bordering Lake Shelbyville. Accordingly, county-level commitment is fairly well divided although Shelbyville considers the lake operations as a major factor in local affairs.

As a consequence, the nature of local development resulting from the operation of Lake Shelbyville differs between the two counties and reflects a stronger commitment to planning and zoning in Moultrie County.

The most difficult community impact to assess is that of expectation. Local leaders, citizens and businessmen expect a "boom" of sorts from Lake Shelbyville, and many political decisions are based on these expectations. The lake has been anticipated for many years and the following excerpts from the Moultrie County Comprehensive Plan and the Shelby County Comprehensive Plan, both adopted in 1964, indicate the local expectations from the lake:

> It is felt that much of the expansion in the future will come in areas directly related to the shorelines of the lake...The proper development of residential, commercial and recreational projects around the lake will benefit agriculture by furnishing an opportunity for employment of the farm population which is currently leaving the area. In addition, proper development will add to the tax base of the total county and thus help support some of the taxes now heavily dependent upon agriculture properties. (Moultrie County Comprehensive Plan, 1964, p. 6.)

> The people of Shelby County have recognized that the installation of the Shelbyville Reservoir will create a number of growth and development problems, among which are the need for the protection of price agricultural lands from encroachment by non-agricultural uses, the control of traffic movement...the guidance of community growth into areas most capable of supporting such growth, and the conservation of natural resources. (Shelby County Comprehensive Plan, p. 2.)

Local Economy

The impact of Lake Shelbyville on the local economy results primarily from its operation for recreation and visitor attraction. The extent of the impact, however, has not been of extraordinary proportions despite the construction

of some new eating places, marinas and bait shops. The period subsequent to filling the lake has been characterized by high interest rates and other restrictions on building. Economic impact is affected by the extreme variations in recreation attendance caused by the climate. Of the total annual attendance at Lake Shelbyville, 51 percent occurs in the three summer months, 20 percent in the peak month, and seven percent in the peak weekend, usually Memorial Day or July 4th. Even during the summer months, there is a wide variation between week days and weekend days. Further, economic impact of a recreation visit is likely to be widely dispersed, with purchases taking place at home and almost anyplace between the home and the lake.

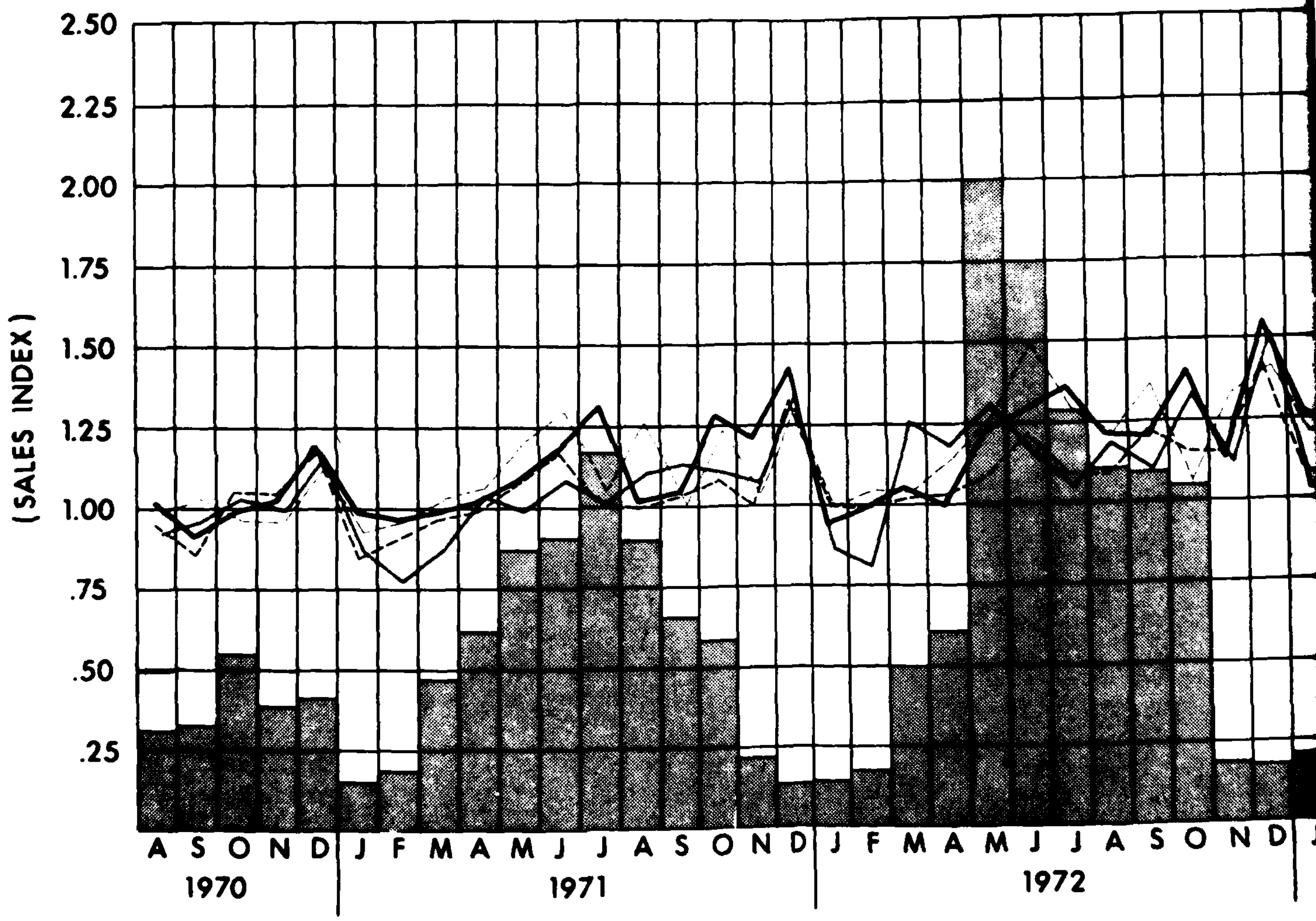
Local retail volume is cited as a major tangible effect of Lake Shelbyville by local businessmen who cite increased volume and expanded inventories. Visitors are viewed as prime customers, although 71 percent come from within a 50 mile radius and are not, therefore, really "new" customers. Trends in retail sales for Shelbyville and Sullivan have been compared to the monthly visitation trends at Lake Shelbyville and retail sales in two other Illinois communities for purposes of establishing a "normal" retail pattern over the same time period. (See Plate III-1.) The two comparison communities are county seats in basically agricultural counties, with similar populations and comparable highway access. The difference is that neither are located near any major recreation area. While retail activity in Shelbyville and Sullivan shows definite summer peaks, so also do the other two towns. Such similarity among the four towns suggests that efforts to relate the retail volume of Shelbyville and Sullivan to the visitors at the lake are at best speculative.

The retail acitivity in Shelbyville and Sullivan in the month of June has been compared for 1970 and 1973, comparing activity before the visitor influx to the lake and during a normal summer visitor month. Retail activity has been enumerated for the same month and years in the two comparable towns with the expectation that operating Lake Shelbyville as a major recreation facility should result in a significantly higher growth rate in Shelbyville and Sullivan. However, such comparison indicates that Sullivan is far below the norm, while Shelbyville is five to seven percent higher than the comparable towns. (See Table III-1.)

The considerable difference in growth rates between Shelbyville and Sullivan can be attributed to several factors. Sullivan experienced a rapid and substantial growth and retail trade increase in the late 1960's before the lake was opened to public use. Such growth could not have been sustained at this pace for any long period of time and, since 1970, the community has been relatively stable in production and consumption. Shelbyville, on the other hand, was economically depressed in the late 1960's and the replacement of the Oliver Plant with comparable job opportunities, some generated by the lake, has restored the community to a more normal rate of growth. Undoubtedly, the lake construction was a factor which encouraged retention of businesses in Shelbyville. Also,

SALES VOLUME COMPARED TO MONTH

AUGUST 1970 - DECEMBER 1973



L E G E N D

COMPARATIVE SALES INDEX FOR CITIES OF:

SHELBYVILLE
SULLIVAN
NEWTON
ROBINSON

MONTHLY VIS
AUGUST 1970

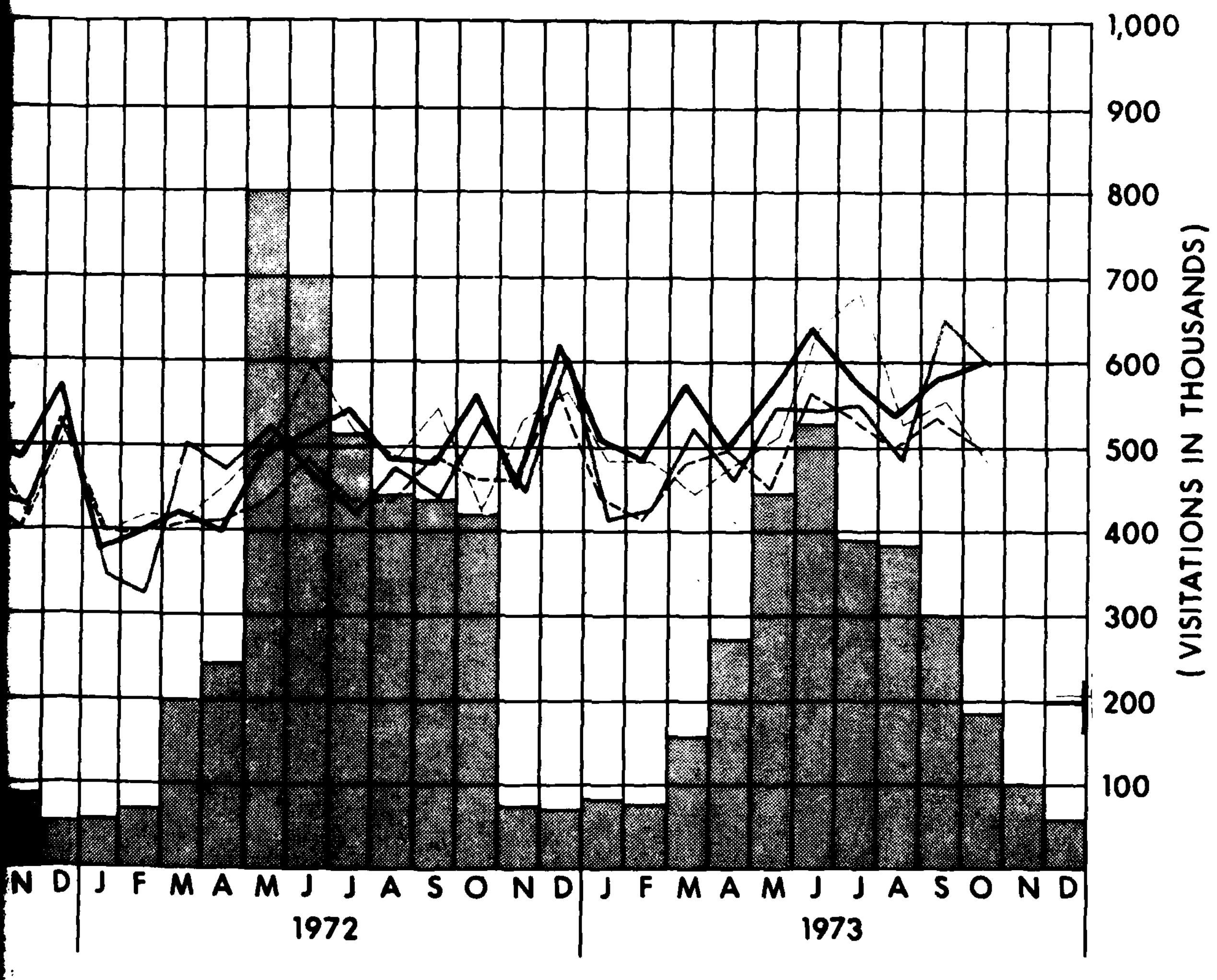
1.00 AVERAGE OF
AUGUST, SEPT
DECEMBER, 19

LAKE SHELBYVILLE, ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
ON
OPERATION AND MAINTENANCE

SOURCE: ILLINOIS DEPARTMENT OF LABOR,
CORPS OF ENGINEERS

MPARED TO MONTHLY VISITATIONS

JST 1970 - DECEMBER 1973



L E G E N D

TIES OF:

MONTHLY VISITATIONS TO LAKE SHELBYVILLE AUGUST 1970 - DECEMBER 1973

1.00 AVERAGE OF THE MONTHLY SALES VOLUME FOR AUGUST, SEPTEMBER, OCTOBER, NOVEMBER AND DECEMBER, 1970.

SOURCE: ILLINOIS DEPARTMENT OF LABOR, CORPS OF ENGINEERS

2

PLATE III-1

Table III-1

INCREASE IN RETAIL ACTIVITY

June, 1970 to June, 1973

	June, 1970	June, 1973	Amount Increase	Percent Increase
Newton	$ 862,800	$1,201,300	$338,500	39
Robinson	1,681,700	2,310,000	628,300	37
Shelbyville	1,199,300	1,730,400	531,100	44
Sullivan	1,180,200	1,277,900	97,700	8

Table III-2

RECEIPTS FROM RETAILERS' OCCUPATION TAX,
SERVICE OCCUPATION TAX AND USE TAX

July, August, September, 1973

Town	Number of Taxpayers	Total Tax Receipts	Percent General Merchandise	Percent Food	Percent Eating and Drinking Places	Percent Automotive and Filling Stations	Percent Other
Robinson	484	$250,985	15	24	8	24	49
Newton	335	155,373	8	20	4	29	39
Sullivan	328	147,966	6	30	10	25	29
Shelbyville	424	192,330	8	25	6	32	29
Carlyle	353	127,960	4	26	8	28	34

it can be assumed that Shelbyville, because of its location at the dam and close to major recreation areas, experiences a greater percentage of both psychological and real impact from the operation of Lake Shelbyville. Identity of the names affects visitors from some distance away, bringing these to Shelbyville.

Comparison of the distribution of retail activity among the various types of business between towns located near a recreation attraction and towns not located near one should reflect a proportionately higher volume in food, eating and drinking places and gasoline station sales in the towns benefitting from almost four million visitors per year. Shelbyville and Sullivan have been compared to Newton and Robinson. As a further analysis tool, the town of Carlyle was included in the comparison because Carlyle is located close to Carlyle Lake which has a comparable recreation visitor potential to Lake Shelbyville. The comparison shows that Shelbyville, Sullivan and Carlyle do indeed have a higher proportion of trade in food and gasoline than Newton and Robinson. (See Table III-2.) However, the difference among the towns is in the vicinity of only approximately five percent.

The operation of Lake Shelbyville for visitor attraction, of course, has resulted in the visible expansion of food services. New franchises have opened in Shelbyville, Sullivan and Findlay, catering to the take-away food demand for pizzas, hamburgers, ice creams, etc. There have been approximately ten new eating establishments constructed in the area over the last three years, possibly accounting for the proportionate rise in retail activity in the eating and drinking place category.

In terms of retail activity, some increase has resulted from the operation of Lake Shelbyville as a recreation area. This has been in the expansion of existing businesses and the growth of some new businesses, primarily eating establishments. Such an increase, however, is difficult to quantify and is not dramatic for reasons previously cited. While not great in their retail volume, the establishment of numerous bait shops, food shops and recreation-oriented businesses around the lake does suggest that future recreation-oriented growth can be expected. (See Plate II-17.)

Although retail acitivity is certainly an important measure of the current economic impact and future potential of the operation of Lake Shelbyville, there are other significant measurements of the impact on local development resulting from the emphasis of lake operation on recreation.

Primary among these is residential construction around the lake adjacent to the fee line. Residential construction is a major indicator of economic health, representing either normal growth as a result of inmigration, family formation and other social functions, or growth encouraged by some outside factor such as Lake Shelbyville. New construction since 1970 indicates that residential growth around the lake has been established as a trend. (See Plate II-17.) The number of new houses, approximately 40 around the lake, is

far less than the number of residential lots which have been platted. Other related improvements in the new subdivisions include streets and even fire hydrants. Because of the tight mortgage market and rising housing costs in the last two years, it is not unusual for the construction pace to be slow. This is particularly true in light of the market for housing around the lake. Permanent residents would be primarily retired persons who have no need to be close to employment, or those who can be employed within a reasonable commuting distance. Employment sources within a 25-mile radius of the lake are extremely limited. New jobs created by industrial and commercial expansion have only absorbed the localsurplus, therefore, have not attracted new residents to the area.

While current trends show a tendency toward traditional single-family subdivision development around the lake, it is more likely that any extensive residential development in the future would be more seasonal or recreation-oriented, such as shared-ownership condominiums and other types of planned unit developments, possibly in connection with clubs or resorts. Further residential development outside the fee line cannot be directly controlled. However, the recreation activities provided by operation of the lake will be a major factor in encouraging residential growth around the lake. For example, intensive development of marinas, hotels, and clubs along the lake shoreline could establish Lake Shelbyville as a major resort or small convention attraction. This, in turn, could encourage multi-family and high-density residential development housing for both the employees of the concessionaires and other new permanent or part-time residents. On the other hand, if the lake remains primarily a hunting, fishing and camping recreation area with limited concessionaires, accompanying residential development will probably remain primarily single-family and medium density.

Property Values, Assessed Valuation

Present operations at Lake Shelbyville have no impact on local assessed valuation that can be quantified or positively correlated. Despite the new construction around the lake, agricultural land removed from the tax roles by acquisition for Lake Shelbyville has not yet been replaced in assessed value by higher assessments of adjacent properties. (See Table III-3.) Although both Shelby and Moultrie Counties have increased in assessed value by approximately ten million dollars between 1967 and 1973, despite the loss of individual personal property taxes in 1972, the state imposed equalizing factor has been increased and accounts in a large part for the apparent rise in assessed value. In 1971, both counties showed a dramatic increase over 1970 valuation which declined again in 1972. This is accounted for by the increase in the equalization multiplier in 1970, followed by the exclusion of individual personal property value in 1972. For example, Shelby County had a multiplying factor of 1.66 from 1967 to 1970, and 210 in 1971. Prior to 1972, personal property was also included, so that the assessed value represented one-half the actual property value plus personal property. In 1972 and 1973, the assessed value represented one-half the actual property value, but no individual personal property. The same holds true for Moultri County, although the equalizing multiplier is lower - 1.219.

Table III-3

ASSESSED VALUATION 1967-1972

Shelby and Moultrie Counties, Illinois

(All figures in millions of dollars)

	1967	1968	1969	1970	1971	1972	1973
SHELBY COUNTY	123.4	N.A.	129.4	123.4	145.2	130.9	133.1
Shelbyville Twp.	20.6	22.3	22.0	20.6	24.7	21.3	21.9
Shelbyville	16.9	18.8	18.4	16.9	20.9	17.3	17.8
Windsor Twp.	5.5	5.6	5.7	5.5	6.5	5.6	5.8
Windsor	2.4	2.5	2.6	2.4	2.9	2.7	2.5
MOULTRIE COUNTY	84.4	86.2	87.6	83.6	101.1	94.3	93.8
Sullivan Twp.	21.9	22.7	23.2	22.0	26.7	24.9	24.8
Sullivan	11.5	12.4	12.7	11.7	14.3	13.3	12.9
East Nelson Twp.	5.3	5.4	5.5	5.3	6.4	5.9	6.0
Allenville	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Marrowbone Twp.	9.2	9.4	9.6	9.0	11.0	10.1	10.1
Bethany	2.9	3.0	3.1	2.7	3.4	2.9	2.9

Because of the changes in both the base and the multiplying factor, increases are difficult to analyze. However, Moultrie County has actually declined in assessed value between 1972 and 1973. The City of Shelbyville increased in assessed valuation by less than $500,000 between 1972 and 1973, equaling $1,000,000 in new construction which represents the completion of a small shopping center and the $300,000 Medical Center. The City of Sullivan, on the other hand, decreased in assessed valuation between 1972 and 1973, accounting for most of the countywide decrease.

Summary of Impact on Local Development

Although it is difficult to quantify, the operation of Lake Shelbyville does have an impact upon the surrounding communities both beneficially and adversely. Certainly, a percentage of the annual operating budget is spent locally in both goods and salaries. The operation of the lake during the recreation season employs approximately 60 people. Off-season operation requires approximately 20 people. This is sufficient basic employment to support a population of 250 to 300 persons.

One of the most desirable impacts of operating Lake Shelbyville as a major visitor attraction is the encouragement and boost it has given local businessmen and leaders; streets have been improved, sewer and water systems installed and refined, store fronts improved in appearance and, in general, the local towns have had a face lifting. Some growth has taken place, although the operation of the lake cannot be credited as the only incentive.

There are, of course, some undesirable impacts from current operation of the lake. The recreation facilities, dam and access areas attract visitors who travel over local roads. As a result, there is a need for greatly improved roads at the cost of local residents. While the need for road improvement increases with visitors, the declining county populations minimize rebates from the Illinois Motor Fuel Tax. The increased vehicular traffic to the lake has more than doubled the annual traffic accident rates. Intense visitor use of the area surrounding the lake has increased service demands on the local communities. Primarily, operation of the lake for recreation, including hunting game, has increased the demand for police, fire and health services. While the undesirable impacts are minimal, considering the size of the recreation facility, they are nonetheless significant because they are not sufficiently offset by positive impacts on the local economy. Increased service demands need increased public revenue. A community's taxing and bonding capacity is based on its assessed value. The assessed value of the area has not grown at a rate proportionate to the need of revenue to cover increased costs of police, fire protection, etc. generated by visitor use of the lake.

In some respects, the imbalance in costs and revenue generated is offset by the fact that 71 percent of the visitors to the lake are from within a 50 mile radius and, therefore, many support the community tax base by residing within Shelby and Moultrie Counties. However, if the lake is to pay its way in the

local community, operations must either de-emphasize recreation and discourage visitation, thereby decreasing service demands, or encourage concessionaires and non-local recreation interests to invest in the lake and, consequently, the community.

Current operation of Lake Shelbyville as principally a hunting, fishing and camping lake will continue to encourage heavy local use, and temporary visitors, who stay briefly, spend little and generate more service demand than income.

Impact of Flood Control Storage

Downstream Effects

Impact on Flooding. The primary impact of flood control storage is the reduction of the peak flow rates that occur in the natural river downstream from the lake. This is well illustrated by the schedule of releases for Lake Shelbyville pool regulation both before and after the navigation project becomes operable.

The maximum release from Lake Shelbyville below pool elevation 626.5 is 4,500 c.f.s. (See Plates II-10 and II-11.) For natural stream conditions for the period 1941-1959, inclusive, a flow of 4,500 c.f.s. has a probable frequency of occurrence of four times in each five years, according to the Shelbyville gage discharge frequency curve. From the pool stage frequency curve for the period 1935-1966, inclusive, the pool elevation 626.5 in Lake Shelbyville has a probable recurrence interval of over 100 years. (See Plate E-3.) The flood storage in Lake Shelbyville prevents all natural peak flows in excess of 4,500 c.f.s. below the Shelbyville dam. This means that no large peak floods with an average recurrence interval of greater than 1-1/4 years can occur under the adopted schedule of releases if the pool elevation does not exceed 626.5.

A secondary positive effect of the Lake Shelbyville storage is related to the flood storage in Carlyle Lake. Before Lake Shelbyville was placed into operation, only Carlyle Lake could control floods from the Kaskaskia watershed above Carlyle Lake. Water was expected to reach the top of the flood control pool in Carlyle Lake (elevation 462.5), on the average of about twice as often as under the joint operation plan for the two lakes.

Studies of the period 1930 through 1959, inclusive, indicated the actual stream flow peaks on the Kaskaskia at Shelbyville and the modified hydrographs under the assumption that maximum outflow releases from the lake would be 4,500 c.f.s. A comparison of the natural and modified hydrographs results in the following summaries.

1940-1959 (30 Calendar Years)

1,800 c.f.s. or more	Natural - 1,166 days	38.9 days/year
	Modified - 1,027 days	34.2 days/year
4,500 c.f.s.	Natural - 250 days	8.3 days/year
	Modified - 498 days	16.6 days/year

In the case of the modified hydrograph, 4,500 c.f.s. is the maximum release assumed from Lake Shelbyville. There is no appreciable difference in number of days bankfull flows occurred below Shelbyville before and after construction of the dam. As to be expected, the considerable overbank discharge of 4,500 c.f.s. occurs for about twice as many days per year as it did under natural conditions.

Since the principal significance of this discussion relates to the agricultural interests below Shelbyville dam, similar figures to those above, but for the months of April through November, for the entire 30 calendar years, are as follows:

1940-1959 (April through November, Inclusive 30 Calendar Years)

1,800 c.f.s. or more	Natural - 626 days	20.9 days/year
	Modified - 519 days	17.3 days/year
4,500 c.f.s.	Natural - 157 days	5.2 days/year
	Modified - 331 days	11.0 days/year

During the agriculturally sensitive times of year, a bankfull flow below Shelbyville dam actually occurs less often than under natural flow conditions. This is approximately the same relationship as for the full calendar year with respect to releases of 4,500 c.f.s. from the lake or from natural flows of that much or more; i.e., 11 days per year would occur under lake releases as compared to 5.2 days per year under natural flow conditions.

In most instances, the natural flows peaked at considerably more than 4,500 c.f.s. Although the number of days during which the lake release was 4,500 c.f.s. is greater than under natural conditions, the lateral extent of flooding under natural conditions generally would be greater than with the controlled lake releases. At times of appreciable lateral inflow below the dam, releases plus such inflows can exceed bankfull capacity.

A composite of the actual record information since beginning of the formal operation of Lake Shelbyville shows the results of regulation. (See Plate I-3.) From the standpoint of the impact downstream from the dam site, a very considerable number of inflow exceeded the 1,800 c.f.s. Kaskaskia River channel capacity from

the dam to Cowden. In the majority of instances, the regulation of the lake held outflows to less than 1,800 c.f.s. Occasionally, the outflows exceeded 1,800 c.f.s. and through the months of January and February, 1973, the maximum mean outflows ranged from 3,200 c.f.s. to almost 4,500 c.f.s. January, February, March and December are months of little or no agricultural activity and, consequently, little or no flood damages result from out-of-bank releases during these four months.

In 1973, the pool elevation exceeded 610 several times. A maximum of 611.76 was recorded from January 3 to January 17; between April 24 and May 17, the pool reached a high elevation of 612.13 on April 28-29; from July 23 to August 22, a maximum elevation of 613.63 was recorded. Because the boat launching ramps become inoperable with pool elevations above 610, the July-August higher pool curtailed recreational use of the lake.

In 1970, the months of August to December had a deficiency of 1.39 inches, but in the next three years the excess above normal rainfall was 18.48 inches - or a net excess in the three year five month period of 17.19 inches. These were wet years.

An adverse impact of the operation of the lake relates to the agricultural damages due to releases made necessary to maintain or achieve certain pool levels. A flood occurs in the Kaskaskia River between the Shelbyville dam and Cowden whenever total flows in that reach exceed 1,800 c.f.s. There are records of occasional inflows from the areas tributary to this reach of the Kaskaskia that will exceed this bankfull condition. The releases from the lake would only aggravate the extent of flooding, but could not prevent it. Occasionally, there are lake releases of 1,800 c.f.s. or less that are supplemented by lateral inflow which, in turn, exceeds bankfull capacity in the above reach. Any releases of more than 1,800 c.f.s. from the lake clearly create flooding conditions on the banks of the floodplain of the Kaskaskia between Shelbyville and Cowden.

Occasional lake releases that ensure adequate flood storage capacity flood the reaches below Shelbyville. In addition, possible agricultural damages during the agriculturally sensitive times of the year (April through November, inclusive) can occur in the floodplain areas. In the reach from Cowden to Vandalia, a serious problem results from partial bankfull flows in the Kaskaskia. Much farmland is tile drained, and has its outlets into the Kaskaskia or tributaries. Whenever flows in the vicinity of the mouth of Ramsey Creek reach or exceed about half bankfull depth in the Kaskaskia, the tile drainage becomes inefficient. At certain stages, water from the Kaskaskia River backing up through the tile drains completely takes the tiled areas out of agricultural usage.

A second criterion related to the tile drainage outlets is that whenever the Vandalia stream gage records 3,000 c.f.s. or more, the stage of the river upstream from Vandalia begins to affect the tile drainage adversely.

Impact on Water Quality. Impoundment of river water tends to reduce the magnitude of fluctuations in quality that occur in naturally flowing rivers. One impact of flood control storage of Lake Shelbyville on downstream water quality is the reduction in turbidity of discharged water compared to inflowing water. During some summer periods of stratification, discharged lake water tends to be lower in dissolved oxygen than stream or lake surface water, but higher than lake bottom water. At most times of the year, dissolved oxygen concentrations of water leaving the lake are equal to or higher than those of water entering the lake. Nitrate and phosphate, and some other iron concentrations of outgoing water, tend to be lower than those of incoming water. However, reduced forms of nitrogen, such as nitrite and ammonia, are usually higher in outflowing than in inflowing water.

Impact on Groundwater. Around the perimeter of Lake Shelbyville, piezometer tips are buried in glacial sediments composed of sand, gravel and clay. Analysis of data indicates a slight, normal rise in groundwater levels both above and below the dam. Anomalous data were obtained, however, for two piezometers where groundwater levels dropped. This drop in groundwater level could be due to formation of an aquiclude, siltation in the aquifer, or location of the piezometers in an isolated aquifer. The lake has, therefore, made no direct change in groundwater levels.

Farther downstream, in the vicinity of Cowden, discharges from Lake Shelbyville substantially, though transiently, raise the water tables of the bottomlands along the Kaskaskia River. The affected agricultural land becomes damp and/or saturated when the Kaskaskia River water surface is elevated by sustained release from Lake Shelbyville.

Impact on Biological Communities. Aeration of water leaving the lake tends to attract fish so that fishing is usually especially good just downstream of the dam. Further downstream there is probably little difference in aquatic communities as a result of flood control storage. Reductions in turbidity and increased stability in flow volumes probably help to increase the productivity of downstream fisheries.

The extent of the control over downstream flooding determines the impact of flood control operations on floodplain communities. Cessation of frequent flooding in certain downstream areas may allow invasion of upland vegetation and colonization of the floodplain by animal species that normally do not live on floodplains.

If flooding during the planting, growing and harvesting seasons is consistently reduced, overall crop yield from the bottomlands will increase. This will adversely affect wildlife both directly and indirectly. First, flooded fields are important to migratory waterfowl and shorebirds as feeding areas. The cessation of annual flooding below the lake is likely to diminish existing downstream waterfowl habitat. Second, the cessation, reduction, or even hope of possible reduction of downstream flooding will result in more intensive agricultural use of the floodplain. Further clearing of bottomland forests can be anticipated, and some areas which are not cultivated during years with high water will be cultivated every year. If areas flooded in previous years are subjected to cultivation, or to more intensive cultivation than previously, there will be a transition from animal species favoring floodplains to those favoring cultivated lands.

Lake Area Effects

Erosion. A major impact of flood control storage relates to the variability of pool levels and the associated bank erosion which occurs principally because of the character of the soils and their vulnerability to physical erosion of the wave impact induced by wind. Some of this damage has already occurred in the three years since official commencement of the regulation of the lake, August 1, 1970. (See Plate II-20.)

Vegetation. Other aspects of pool level variations inherent in operation for flood control purposes and related to erosion include the impact on shoreline vegetation. Upland plants growing along the shoreline of a new lake are generally intolerant of high water levels and die if inundated for extended periods during the growing season. Even the most tollerant bottomland species do not survive continuous inundation, although some individuals may not die for several years (Yeager, 1949). Rises in the groundwater table may kill some of the more sensitive species even without inundation. Where water levels fluctuate, the season and duration of high water and the age and species of trees in the affected area are the primary factors influencing mortality.

In upstream portions of the lake, many trees at elevations below normal flood pool were left standing. Most of these have died and the remainder can be expected to die within the next few years. At elevations above normal pool (599.7 feet msl), some bottomland species such as willow and ash may survive even though they are inundated annually for a portion of the growing season. Tree reproduction, as well as mortality. will be affected in upstream areas. During low water years, seedlings may become established where water is drawn down, but these will probably be killed in subsequent years. Successful reproduction and growth cannot be expected except at elevations where the probability of flooding for periods of 30 days or more in one growing season is fairly low.

Most timber along the main length of the lake was cleared to elevation 603 before the pool was filled. Because most of the trees above elevation 603 are upland species, most of those growing near the shoreline have died as a result of sustained high water levels during the 1973 growing season. The effects of fluctuating water levels can be expected to continue for many years. High water during consecutive seasons undoubtedly will result in additional mortality, and weakened individuals will be susceptible to disease. Upland species will almost certainly be eliminated to an elevation of at least 615. More sensitive species and individuals above that elevation may eventually be killed by inundation during exceptionally wet years. At lake elevation 615 approximately an additional 7200 surface acres will be inundated. Approximately 4300 acres of this is wooded, though stocking levels per acre vary widely. The most apparent impact of this band of flood killed trees is that it is aesthetically unpleasant. In time the loss of this vegetation around the shoreline will increase sediment deposit in the lake through erosion. The dead trees will topple into the lake causing a safety hazard to boaters. The recreation and wildlife value of these trees is gone. Fish habitat is, however, temporarily improved while these trees were inundated.

Reproduction of upland trees at elevations subject to fluctuating water levels will generally be unsuccessful. Seedlings of upland tree species may be killed by only a few days of inundation, whereas silver maple and willow seedlings may tolerate as much as two months of inundation. As bottomland species invade the new shoreline, the length of time required for them to become established is unknown, but there was little or no evidence of seedling growth along upland forest shores during 1973. Several factors may interfere with establishment of bottomland tree species seedlings along the main shoreline of the lake. First, steep and eroding banks may not provide a sufficiently stable location for root establishment. Second, wave action may be severe enough to cause damaging abrasion and accelerate erosion. Third, extended drawdowns to levels even several feet below seedlings may result in excessively droughty conditions for species better adapted to poorly drained soils and plenty of available moisture. Finally, seedlings which might survive a first favorable year may be killed by more extreme conditions in following years.

Wildlife. Fluctuation of lake levels is detrimental to animals for three reasons. First, the damage to vegetation results in a loss of habitat for animals. Trees with the greatest food value, such as oaks and hickories, are eventually replaced by trees of lesser food value such as willow and maple. Second, rapidly rising water levels, especially during breeding season, can displace bank denning mammals and endanger turtle eggs and ground nesting bird eggs deposited near the lake. Third, increases in water level in late winter, as occurred in January, 1974, flood bottomlands in the small tributaries all around the lake. These

bottomlands, particularly in the Conservation Department areas, are important sources of winter food for many species and winter flooding destroys or renders this food inaccessible.

Resident bottomland mammals are displaced by flooding and many can be expected to perish (Yeager and Anderson, 1944), particularly non-aquatic mammals such as woodchucks. Resident Eastern fox squirrels and White-footed mice climb trees and brush and can outlast even fairly prolonged flooding (Hoslett, 1961; Batzli, 1973).

Water Quality and Fish. To a limited extent, fluctuations in pool levels tend to decrease the severity of pool stratification and associated problems with lake water quality. Water quality is adversely affected by bank erosion because of increased siltation.

Instability of banks adversely affects fish habitat because of heavy siltation which may damage fish directly or may settle over areas where their eggs have been deposited. Expanses of land that are alternately under and above fresh water do not establish productive fresh water or terrestrial communities. Areas that are primarily aquatic but are subject to frequent or lengthy drawdowns do not support the fish food organisms normally found in shallow water. Since fish are often restricted to shallow oxygenated water during stratification of the lake, the deficiency in benthic organisms and aquatic weeds in these areas is particularly significant.

Fluctuations in pool levels can have adverse impacts on fish populations during spawning periods. Drawdowns leave fish eggs exposed to desiccation while rises in the pool may deposit silt or debris over eggs or cause abandonment of the nest by adults.

Recreation. Adverse effects to the recreational qualities of the lake occur because pool levels in excess of elevation 610 place all boat ramps out of operation. The 610 pool elevation has an approximate frequency of occurrence of, on the average, once in about five years and the higher 620 elevation has an average recurrence interval of about 100 years. The dam west access area has sanitary facilities which become inoperable and have to be closed down whenever the pool stage exceeds approximately 612. (About seven or eight year frequency.)

Another problem results from the fact that after pool levels decline, the previously inundated shores usually are left quite unsightly and, in most instances, not usable for recreational purposes without extensive and often expensive maintenance.

Adverse effects on water quality and on the fishery also affect recreational use and enjoyment of the lake.

Impact of Resource Management

Impact on Water Quality

Erosion. Impacts of resource management on water quality are minor. Some eroded areas such as abandoned borrow pits or road cuts have been seeded or planted with shrubs. These efforts help to reduce the flow of sediments into the lake, but most of the upstream erosion problems are outside of fee-owned lands. The amount of sediment from treated areas is trivial compared to existing and anticipated problems of shoreline erosion.

Withdrawal. When the lake is stratified, the depth from which water is withdrawn influences its quality. Water from the surface is warmer, better oxygenated, and sometimes lower in nutrients than water from depth. Water withdrawn from the 550 foot conduit elevation is almost fully reoxygenated by the turbulence caused during withdrawal so that low concentrations of dissolved oxygen downstream of the dam are not a problem. Water is nearly always withdrawn from depth. If the top layer of oxygenated water were depleted during the summer, the quality of lake water would be seriously impaired and fish kills might result.

Impact on the Fishery

Because a good fishery would be considered an important recreational asset of the lake, management is fairly active. The Division of Fisheries of the Illinois Department of Conservation is responsible for fish management at Lake Shelbyville.

Stocking.* Of the different species of fish stocked in Lake Shelbyville, only the largemouth bass appeared to be successfully established in 1973. White bass are expected to be successful in the future, but smallmouth bass will probably have to be raised to non-vulnerable sizes in nursery ponds. Northern pike have apparently died out. Walleye populations are most successful below the dam. Bluegill are slowly becoming established in the lake.

Growth of largemouth bass in the marsh nursery pond was exceptionally rapid (Dufford, 1974), and release of relatively large individuals into the lake helped to improve their survival rate. Successful stocking of large individuals helps to improve fishing in the lake and to speed achievement of balanced populations of predators and prey. After more game fish populations become established in the lake, fishing should improve.

The stocking of non-native fish might have some adverse impact on native species, but in most cases the introduced species will probably just be unsuccessful.

*From Fritz, 1973.

Surveillance. The creel census has no impact on fish populations, but helps to indicate the size and condition of existing fish populations. The fall survey is an effort to collect a representative sample of the fish present in the lake. Although fish may be removed from the population, the information gained is useful in assessing the benefits gained from various stocking attempts.

Pool Fluctuations. So far, it has been possible to maintain fairly stable pool levels during critical periods of the mid-May to mid-June spawning season, and this practice helps to assure that fish populations will contain individuals of every age class.

Fall and winter drawdowns have been considered as a fish population management tool but have not been implemented.

Impact on Lake Fluctuations

The main purpose of pool fluctuations is for flood control. Only a few isolated cases of pool elevation regulation for the purposes of resource management have occurred so far. Stable, or slowly increasing, pool levels during mid-May to mid-June of 1973 were, in part, an attempt to benefit the fishery resource.

Fall pool elevations have been manipulated in an unsuccessful attempt to attract migrating waterfowl to the area.

Impact on Shoreline Vegetation

Management of the water resource affects shoreline vegetation. The impact on existing shoreline vegetation has been discussed in the section on "Impact of Flood Control Storage", but the extent of the potential problem is reflected by examining the magnitude of potential pool level changed which might result from management for a variety of project purposes.

The difference in surface area between the top of the joint use pool (599.7 feet) and elevation 613 feet, or 10-year frequency level, is 6,400 acres. This area, which is approximately 25 percent of the surface of the lower flood control pool, is subject to relatively rapid, irregular and prolonged shifts between aquatic and terrestrial conditions. Because this is a situation different from naturally occurring phenomena, few organisms are tolerant of these types of changes. Eventually, different plant and animal populations will become established along different zones representing frequency and seasonality of changes in lake elevation, but even these populations would be subject to significant adverse impacts during periods of unusual water levels. There is more than a tenfold difference between the surface area of the lowest expected water level (inactive storage pool) and that of the highest expected water level (top of surcharge pool). It is possible

that the nearly 33,000 acres between these pool levels will occasionally experience shifts between terrestrial and aquatic conditions. The duration and timing of any such changes will influence the severity of the impact.

Impact on Trees

Shoreline Effects. The impacts of existing resource management practices on shoreline trees have been discussed. Trees have been killed by high water but only those within heavy use areas are being removed.

Recreation Areas. The management of woodlands on Class II lands will preserve old trees and result in a normal age structure within forested areas. Forests will be kept healthy by removal of diseased individuals and control of pests.

The growth of forests will be prevented in some areas by management practices designed to maintain early successional vegetation. The use of herbicides, cutting, and burning will result in temporary damage to the natural landscape.

Impact on Wildlife

The wildlife management techniques to be employed are established practices known to increase habitat for an abundance of upland game species. These practices are likely to increase the habitat for many non-game species as well, particularly passerine birds, rodents, and birds, mammals and reptiles that prey on rodents and bird eggs. The impacts of these management practices on most animal species, however, are unknown.

The processes of mowing, discing and burning to be used undoubtedly kill some small mammals, reptiles and amphibians, although the restriction of these practices to late summer and autumn minimizes their adverse impact on ground-nesting birds.

The planned conversion of fields currently at the eight to 12 year stage of succession to earlier stages of succession through management practices that involve treatment such as mowing, discing or burning every three years will result partly in a change of animal species composition from a fauna preferring brushy fields to one favoring very early weed stages of succession.

The general impact of the wildlife management practices should be a stabilized, abundant and diverse fauna.

Impact on Encroachments and Leases

Encroachments onto fee-owned land are noted quickly and curtailed. In cases where farmers have farmed or grazed and watered

stock, cooperation has been sought on an individual basis. Few cases have required the attention of law enforcement officials.

About 1,200 acres of the land which is managed by the Department of Conservation is leased to local farmers for cultivation, provided that they plant a specified crop and leave one-third of it in the field. It is believed that this practice is beneficial to wildlife in that it provides food and increases the edge habitat between cultivated and shrub or woodlands. The lease system for cultivation is considered desirable and will probably be continued.

Recreation

The 16-county region (identified as 3B) in the 1972 Illinois Statewide Comprehensive Outdoor Recreation Plan had a population of 631,570. Approximately six percent of this population resided in Moultrie and Shelby Counties. The state estimated 58,053 acres of total regional recreational facilities as of 1970 in the 16-county, 10,586 square-mile area. The project area (34,408 acres) accounted for 40 percent of all recreation lands in the region.

Lake Shelbyville Regional Recreation Impact

Activity	1970 Regional Facilities	1973 Shelbyville Facilities	Percent of Regional Facilities Provided by Lake Shelbyville
Picnicking	6,622 sites	404 sites	6
Camping	3,751 sites	1,242 sites	33
Swimming	185 pools and beached	5 beaches	3
Fishing & Boating	56,915 acres	11,100 acres	20

Recreation facilities are relatively poorly developed and thinly distributed throughout the two-county region. Almost all of the 16-county region is within 100 miles of the Shelbyville project. The Illinois Department of Conservation, in its 1973 Annual Management Plan for the State Parks at Shelbyville, estimated that Lake Shelbyville provided in excess of 4,800,000 recreation days of activity. The Shelbyville project makes a substantial contribution to regional recreation needs.

Visitation Data

Visitor statistics are systematically collected for the project area according to standard procedures. Visitors are surveyed

on a typical Wednesday and following Sunday three times during the recreational season (spring, mid-summer and fall), with project staff interviewing the occupants of all vehicles entering the Coon Creek, Opossum, Sullivan and Lithia Springs access areas over a 12-hour period. The following information is collected:

1. Number of vehicles, recreational or non-recreational vehicle, previously surveyed vehicle, or a return vehicle.

2. Number of visitors per car remaining in the area for a minimum of one hour.

3. Number of boat or camping trailers entering the area.

4. Visitor's actual or anticipated activity participation (amount and type of activity). (Sightseeing is listed only if that is the sole purpose of the visit; picnicking includes any prepared meal consumed on land or in a boat; and campers are not considered picnickers.)

5. Travel distance to the site from home.

6. Number of estimated annual visits to the project area.

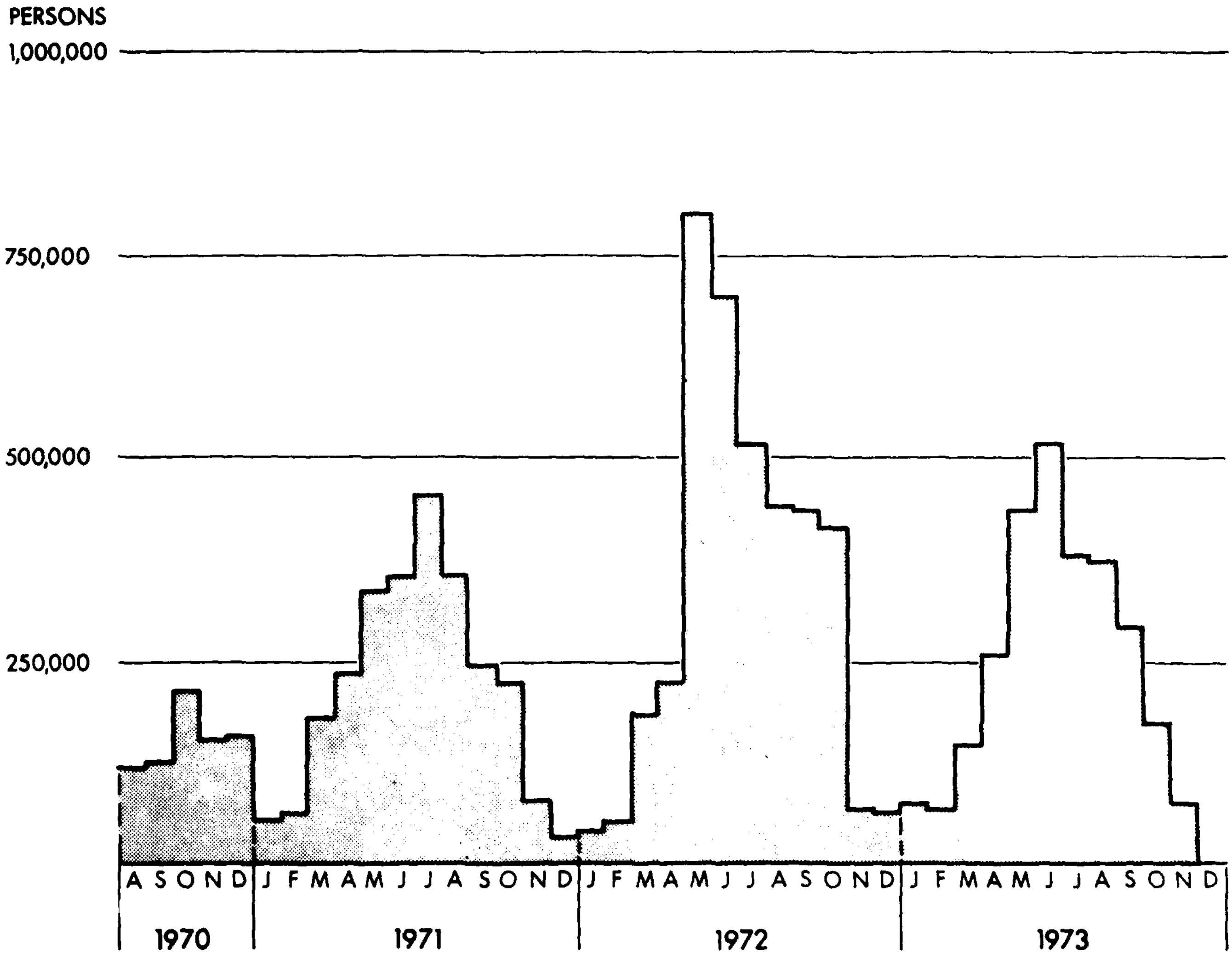
The measure of daily visitor attendance and participation during that 12-hour period is used as the basis for estimating total annual visitations.

Visitations have varied considerably since normal pool elevation was reached in July, 1971. (See Plate III-2.) In 1972, annual visitor volumes reached 3,900,000, a 33 percent attendance increase over 1971 and a 69 percent increase over 1970. In 1973, attendance was estimated at 2,800,000. This 28 percent decline partially resulted from unusually high water levels. (See Plate I-3.)

The highest three-month periods in 1972 and 1973 were May, June and July. These three peak months accounted for 51 percent of the annual attendance in 1972, while the three-month period of December, January and February accounted for only 3.3 percent.

The peak use month has varied considerably, probably as a result of weather and the limited time the facility has been in operation. To date, the greatest number of monthly visits occurred in May, 1972 - almost 800,000 visits, 20 percent of the annual visits. The heavy spring use can probably be explained by the fact that 71 percent of all visitors live within 50 miles of the project. Higher temperatures may discourage some mid and late summer visits.

A total of 185,000 visitors were recorded during Memorial Day weekend 1973, 6.6 percent of annual visitations. This three-day weekend account for the highest weekend attendance rate of the year.



MONTHLY VISITATION
LAKE SHELBYVILLE, ILLINOIS

LAKE SHELBYVILLE ILLINOIS

PLATE III - 2

Estimated Visitor Capacity

Recreation facilities provided at Lake Shelbyville are based upon water-oriented activities. The water is the major attraction. The attraction is a limited resource. Even though the lake is a large one, there is a point at which so many people and boats would be on the lake that none would have a satisfactory recreation experience. Operation of the lake as a huge recreation facility should be designed to discourage this type of over-use.

At what point does over-use occur? This cannot be determined precisely, as measurement systems for this type of analysis are quite crude. One such study indicates that the present control system would result in a "capacity" on Lake Shelbyville of about 2,650 boats. (See Plate III-3.) With 38 percent of the visitors boating, a reasonable maximum daily attendance would be about 47,500. In 1973, Memorial Day had about 62,000 and Labor Day 47,200 visitors. Thus, there may have been a few instances of adverse effects from over-capacity recreational use of the lake.

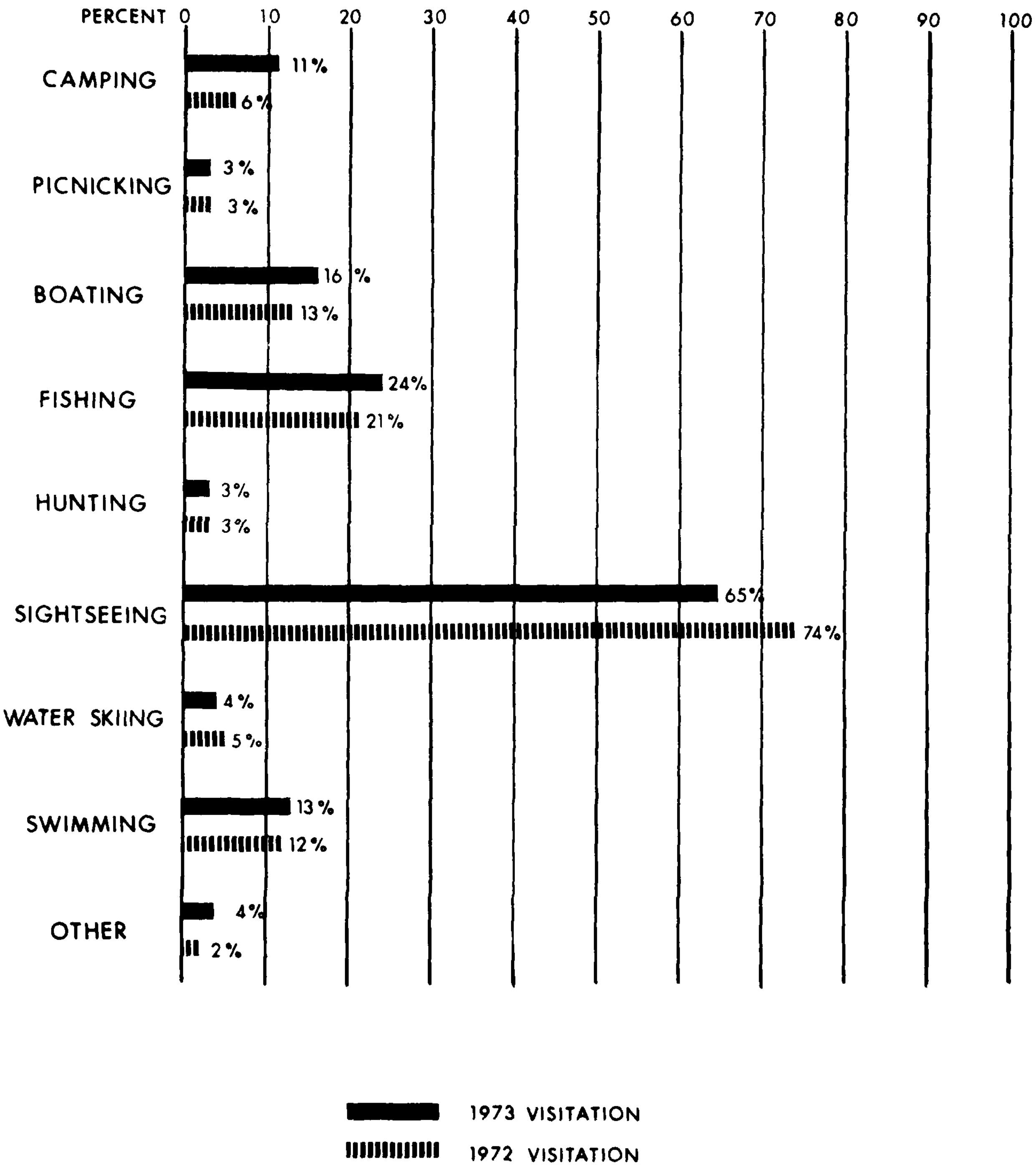
Saturdays and Sundays account for 55 percent of the visitors. When Fridays are added, two-thirds of the use is found on weekends. Additional visitors may be accommodated without any overcrowding by providing incentives for more weekday use and by encouraging more land-based recreation activities.

Land based recreation facilities play an important visitor role. A major influence on visitor use and operation-maintenance is the vehicular circulation system. Only minor modifications of the existing road system have been made to meet project needs. As a result, congestion and inefficiencies in operation occur. Access to the lake area is impossible to control, while access to developed recreation areas is expensive to maintain.

In 1973, Campground F was opened to serve as an overflow camping area. Previously, overflow demands were handled at individual access campgrounds. This resulted in over-use on some of the facilities on peak weekend days. Campground F is used only when all other campgrounds have been filled to capacity. As a result, the access campgrounds support a maximum use level on weekend days through much of the recreation season. There are already indications that present levels of use of the campgrounds has resulted in damage to natural plant material and in erosion and shoreline damage which, if continued, will be detrimental to the environment and to the camping experience.

Since normal pool elevation was obtained in 1971, the man-made swimming beaches have been usable for only 60 percent of the recreational season. High water levels during these years have required substantial beach maintenance.

PERCENT OF TOTAL VISITATION
(1972 - 1973)



LAKE SHELBYVILLE ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
ON
OPERATION AND MAINTENANCE

PLATE III-3

Fishing and Wildlife

The environmental impact resulting from fishing and hunting is relatively minor. Fishing is the second-most popular visitor activity. Because 75 percent of all fishermen use boats, the lake absorbs the principal fishing impact. Forty-seven percent of all boats on the lake are estimated to be fishing boats. (See Plate III-4.) When the lake is being used to its resource capacity, fishing boats occupy about 4,000 acres of water surface or 37 percent of the lake. Spatial requirements for boat fishing are relatively low and, as a result, approximately 64 percent of all people boating are fishing.

Bank fishermen compose 25 percent of the project's fishing population. Most bank fishing i concentrated near the dam where high use levels have required additional picnic and restroom facilities. Additional facilities such as parking lots, restroom and fishing piers are needed around the lake to encourage more bank fishing use of the lake. Bank control will be needed to control erosion resulting from more intensive shoreline use. These facilities would make a substantial contribution toward restricting visitor impact on the area.

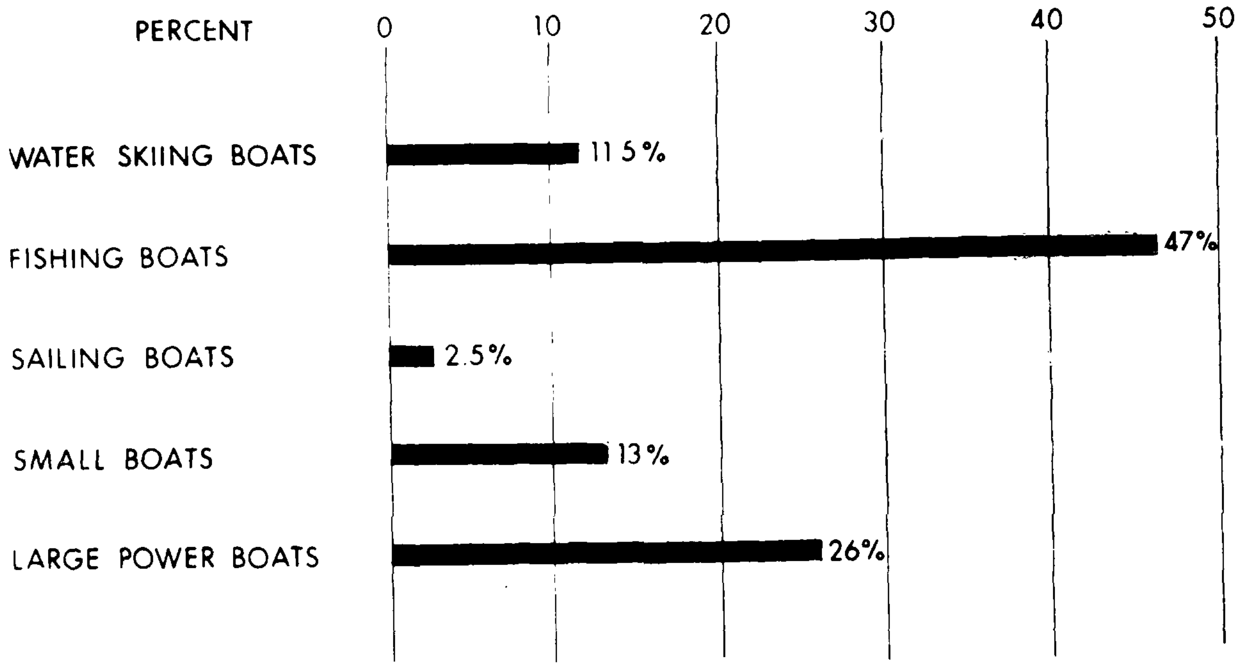
Three percent of the visitors participate in hunting. During November, the percentage increases sharply to 16 percent. Because the hunting season does not occur during the primary recreational season, and because no rare or endangered species occur in the area, hunting has a very limited impact on other forms of recreation.

Visitor Economic Impact

Some $69,122.00 was collected in recreational fees at Lake Shelbyville in 1973. Between Memorial Day and the first week in August, camping fees were collected at Opossum Creek, Coon Creek, Lone Point and Lithia Springs. This accounted for $39,191.00. From the beginning of July to the last day in September, $26,191 in camping fees were collected at Whitley Creek and at Sullivan access areas. The state collected $3,740 at Wolf Creek and Eagle Creek.

There are currently in place or being built 1,242 project campsites distributed in eight campgrounds. Of the 786 sites provided and maintained by the Corps, the majority are classified as Class A campsites. Class A campsites are provided with hot showers, flush toilets, controlled access, and dustproofed or paved roads.

The operation and maintenance cost requirements of these areas are in excess of the fees collected. Based upon the assumption that specialized camping facilities should be paid for by the user, it can be expected that facility use should pay for its own maintenance. If Class A campgrounds are to pay for the maintenance



ESTIMATED BOATING TYPES

SOURCE: RESERVOIR PROJECT MONTHLY VISITATION DATA
AND CORPS STAFF ESTIMATES

LAKE SHELBYVILLE, ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
OF
OPERATION AND MAINTENANCE

PLATE III-4

services required, it is necessary that the size of the campground and user fee be increased. Based upon the camping demand, the facilities provided and estimated maintenance costs, each Class A campground should be composed of a minimum of 160 campsites.*

Increasing camping fees as well as doubling the size of existing Class A campgrounds would be necessary to obtain economic self-sufficiency. Class A camping fees should reflect rising construction and maintenance costs as well as the facility level provided. The extent and quality of the facilities offered determine the rate campers will pay.

Discharge of Marine Toilets

Most boats on the lake are used for short-term recreational use and do not require toilet facilities. Usually, land-based sanitary facilities are readily accessible and adequate to handle the need. To preserve the resource and to accommodate multiple uses, sewage discharge into the lake is strictly regulated. The existing pumpout facilities, located at Findlay and Lithia Springs marinas, and law enforcement have probably served to minimize this impact. Information currently available suggests that marine toilets are not creating an environmental impact of significant proportions.

Sewage Facilities

The existing on-site sanitary facilities are currently operating as designed, and are not creating any adverse environmental effects. The package treatment plants and existing vault toilets are all sited above the 50-year flood level (about elevation 618). Waterborne toilets below this level could be inundated but would require only minor repair and cleaning to be operative. No significant environmental impact would be anticipated.

If flood levels threaten to inundate the package treatment plants, the storage tanks are pumped out and filled with water. Because of limited size of these tanks (113,000 gallons total, assuming capacity equals the volume of the air contact chamber), flooding would not constitute a problem. If inundation of the treatment plants occurred, the effluent (even in its raw form) would be so diluted that no appreciable impact would be felt.

Solid Wastes

Solid waste collection and disposal is maintained at a high level. No appreciable adverse environmental impact results.

*Harland Bartholomew and Associates, 1973, Clarence Cannon Dam and Reservoir - Camping Facilities Economic Study, U.S. Army Corps of Engineers.

Vestor Control

No control program has been undertaken at the lake. Natural controls appear sufficient so that visitor use has not been curtailed.

Concessions

The only adverse environmental impact resulting from concessions is the land which has been lost to other development. No adverse impacts currently result from concessionaire operation or maintenance procedures except for some soil erosion resulting from poorly surfaced drives and parking areas or from graded areas where plant cover has not been established.

New and Continuing Construction

Two-hundred-fifteen campsites and 50 tent campsites will be added in four existing access areas. All of the new campsites are located where there is adequate space for the facilities. Improvements such as water, electricity and roads, as well as comfort stations (waterborne where there is an existing treatment plant available), will be provided. The new campsites will be quality accommodations and some existing campsites will be upgraded so that the impact on the environment will be more favorable. For example, providing comfort stations and trailer pump-outs, reduces the hazard of lake pollution from sanitary facilities.

The new campsites are located in woodlands, and approximately one-fourth of the sites will have access to the lake shore. The woodlands and the shore will show the impact of camper use. Some wildlife may desert the area because of increased human use.

The construction of new parking facilities at the entrance areas will improve the aesthetics of these areas. They will be more orderly appearing, less dusty, and their use will cause less damage to the natural ground cover.

PART IV

ADVERSE ENVIRONMENTAL EFFECTS AS THE RESULT OF OPERATION AND MAINTENANCE ACTIVITIES

ADVERSE ENVIRONMENTAL EFFECTS AS THE RESULT OF OPERATION AND MAINTENANCE ACTIVITIES

Following is a list of the adverse environmental effects resulting from operation and maintenance activities. These are summarized from the overall discussion of all environmental effects described in the previous section.

From Flood Control

Adverse effects from flood control result from the unavoidable fluctuation of pool levels, from the length of time the water levels were held above the 599.7 level, and from prolonged high rates of downstream discharge.

Downstream Impacts

Farmlands along the Kaskaskia River, particularly between the dam, Cowden and Vandalia, are adversely affected by prolonged water releases of 4,500 cubic feet per second or more - a discharge specified when pool elevation exceeds 610 feet, and will continue to be affected until the authorized levees in this reach are constructed.

Prolonged flooding of farmlands results in loss of terrestrial habitat, loss of food and killing of wildlife.

Pool Area Impacts

Bank erosion has been caused by high and fluctuating water levels.

Elevated pool levels in combination with high winds have generated destructive waves that rapidly erode moderately steep to steep shorelines, undermining trees growing on the banks.

High water levels maintained for 30 days or more have damaged forested areas.

Along the flatter upper reaches of the lake, high water has altered some terrestrial habitat, affecting the area's wildlife. Den sites have been submerged, burrows have been flooded, and natural food supplies have been destroyed.

Time and duration of water level change have damaged fish and fish population structure.

The eggs of other aquatic wildlife, such as turtles, probably have been lost due to fluctuations in pool level.

Winter drawdowns, when the lake is ice covered, have resulted in the death of fish trapped in shallow areas.

Recreation has been curtailed by high water levels. Swimming beaches are unusable when the water level varies three feet above or below the 599.7 pool level, while boat ramps are under water and, therefore, unusable at pool elevation 610. One comfort station is flooded at 612 feet and some camping and picnicking facilities are submerged at 620 feet. For the 908 days of operation ending January 1, 1974, swimming beaches were unusable 39 percent of the time and boat ramps eight percent.

From Navigation

There have been no effects, adverse or beneficial, because no demand for water has yet been imposed for either the Kaskaskia or the Mississippi. However, should Lake Shelbyville be drawn down substantially below the 599.7 pool level to aid navigation on the lower Kaskaskia and Mississippi during a regional drouth, extensive areas of lake bottom would be exposed and adverse effects could be consequential.

From Water Supply

There have been no adverse impacts because no demand for water has been placed upon the lake to date. Use of the lake for public water supplies could aggravate drawdown problems during droughts.

From Fish and Wildlife

Management and use of fee-owned lands for wildlife has diminished their value as natural areas.

From Recreation

Extra traffic generated by visitors to the lake has overburdened local roads which have poor vertical and horizontal alignment and deteriorated road surface. Traffic accidents have increased.

Accidents and occasional drownings occur from operation of the lake, particularly for swimming, boating and fishing activities.

Power boats create wave actions that result in increased shoreline erosion.

Natural areas have been displaced by camping areas, marinas, picnic grounds, etc.

There have been a few instances where the recreational experience has been impaired by over-use of the lake.

Use of campgrounds has resulted in destruction of natural vegetation and some soil and shoreline erosion.

From Total Complex

Strippable coal deposits are located under the lake. There is presently no economical way to exploit such deposits when they are under water.

Requirements for road improvements and additional police and fire protection have placed a political and fiscal strain on local communities.

PART V

ALTERNATIVES TO EXISTING OPERATION AND MAINTENANCE ACTIVITIES AND CONTINUING OR PLANNED CONSTRUCTION

PART V

ALTERNATIVES TO EXISTING OPERATION AND MAINTENANCE ACTIVITIES AND CONTINUING OR PLANNED CONSTRUCTION

Interim Regulations of the Environmental Protection Agency for the preparation of Environmental Impact Statements include the following instructions concerning the analyses of "Alternatives":

> "Develop, describe, and objectively weigh alternatives to any proposed action which involves significant tradeoffs among the uses of available environmental resources. The analysis shall be structured in a manner which allows comparisons of: (1) Environmental and financial cost differences among equally effective alternatives, or (2) differences in effectiveness among equally costly alternatives. Where practicable, benefits and costs should be quantified or described qualitatively in a way which will aid in a more objective judgment of their value. Where such an analysis is prepared, it shall be appended to the statement. The analysis of different courses of action shall include alternatives capable of substantially reducing or eliminating any adverse impacts, even at the expense of reduced project objectives. The specific alternative of taking no action must always be evaluated. . . . ."

Operation and maintenance of a multi-purpose project necessarily must be based on policies related to carrying out the several project purposes. A policy or action may satisfy one purpose and impair another. Operation and maintenance of any multi-purpose project is inherently a compromise. Thus, there are countless alternatives emanating from the several purposes and each of the alternatives has differing effects upon the environment. To simplify consideration of any alternative, its effect upon the project purposes and the environment should be judged. Unless there would be an improvement in achieving project purposes and an improved environment over current operation and maintenance practices, there would be little purpose in more detailed study of an alternative. Of course, certain project purposes, i.e. recreation, may be more important than another such as navigation and, at times, because of relations to wider areas of concern flood control may be of compelling importance. Also, some actions may impair parts of the environment while enhancing others.

Yet even a crude rating system with effects classified as "good", "fair", "poor", and "none" will be helpful to appraisal of alternatives.

For this reason, the following discussion of each alternative will conclude with such a summary. For comparative purposes, the present system of operation and maintenance is rated as follows:

Effect of Present Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Fair to Good	Social - Good
Recreation - Fair	Economic - Fair

Abandonment Alternative

Description. This involves the extreme measure of opening the dam by removing the spillway section and restoring the river, as nearly as possible, to the original channel and floodplain conditions.

Impact. All benefits expected from the operation and maintenance of the project for flood control, navigation, water supply, fish and wildlife, and recreation would be eliminated. There would be major costs for restoration of approximately 34,000 acres of fee-acquired land, much of which was cleared of timber. Additionally, structures that had been provided for dam operation, recreation, water use, etc. would have to be demolished. At least for the first few years following abandonment, the former lake area would be extremely unsightly, even if restoration were undertaken. Abandoning the project would have an adverse socio-economic impact on Shelby and Moultrie Counties. Dam operation and maintenance jobs would be eliminated, fewer tourists would visit the area, and some recreation-connected businesses would close.

Approximately 34,000 acres that the project removed from county tax rolls would eventually revert to private ownership. Shelby and Moultrie Counties would not have to expand such services as secondary road building and maintenance and law enforcement because fewer people would visit the counties.. Coal reserves formerly covered by the lake would become more exploitable.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Poor	Total - Poor
Navigation - Poor	Physical - Poor
Water Supply - Poor	Biological - Poor
Fish and Wildlife - Fair	Social - Poor
Recreation - Poor	Economic - Poor

In conclusion, this alternative is unacceptable because all project benefits would be lost, and such losses would not be balanced by socio-economic or environmental gains.

Flood Control Alternatives

Several possible alternate schemes of operation and maintenance will be discussed in this section.

Alternative No. 1:

Reduce Flood Control Aspects and Limit Lake Releases to 1,800 cfs.

Description. This proposed alternate would use the following as some of its objectives and guidelines:

(1) Hold pool at elevation 599.7 (top of joint use pool).

(2) Limit pool fluctuation between elevation 610 (storage 345,000 acre-feet), and 596 (storage 168,000 acre-feet).

(3) The limits mentioned in (2) make available 177,000 acre-feet of flood storage to control the more frequent floods. This is equivalent to 3.21 inches of runoff.

(4) During agriculturally sensitive seasons, limit releases to a maximum of 1,800 cfs whenever the pool is within the limit given in (2).

(5) During winter (non-agriculturally sensitive period), limit releases to a maximum of 4,500 cfs, and hold pool at or above elevation 596.

(6) Change release rates as slowly as possible in order to minimize sudden drops or rises in pool elevations.

(7) Whenever heavy rains occur over the watershed below the Shelbyville damsite during the active farming periods, cut back the releases from Lake Shelbyville insofar as is practical. Retain the lower minimum release of 10 cfs.

(8) When a rare, heavy storm produces runoffs from the area above Shelbyville, such that some of the guidelines given above cannot be adhered to, follow the regulations in Lake Releases Plan VII (developed in the 1969 Joint-Use Analyses for the Regulation of Lake Shelbyville and Carlyle Lake).

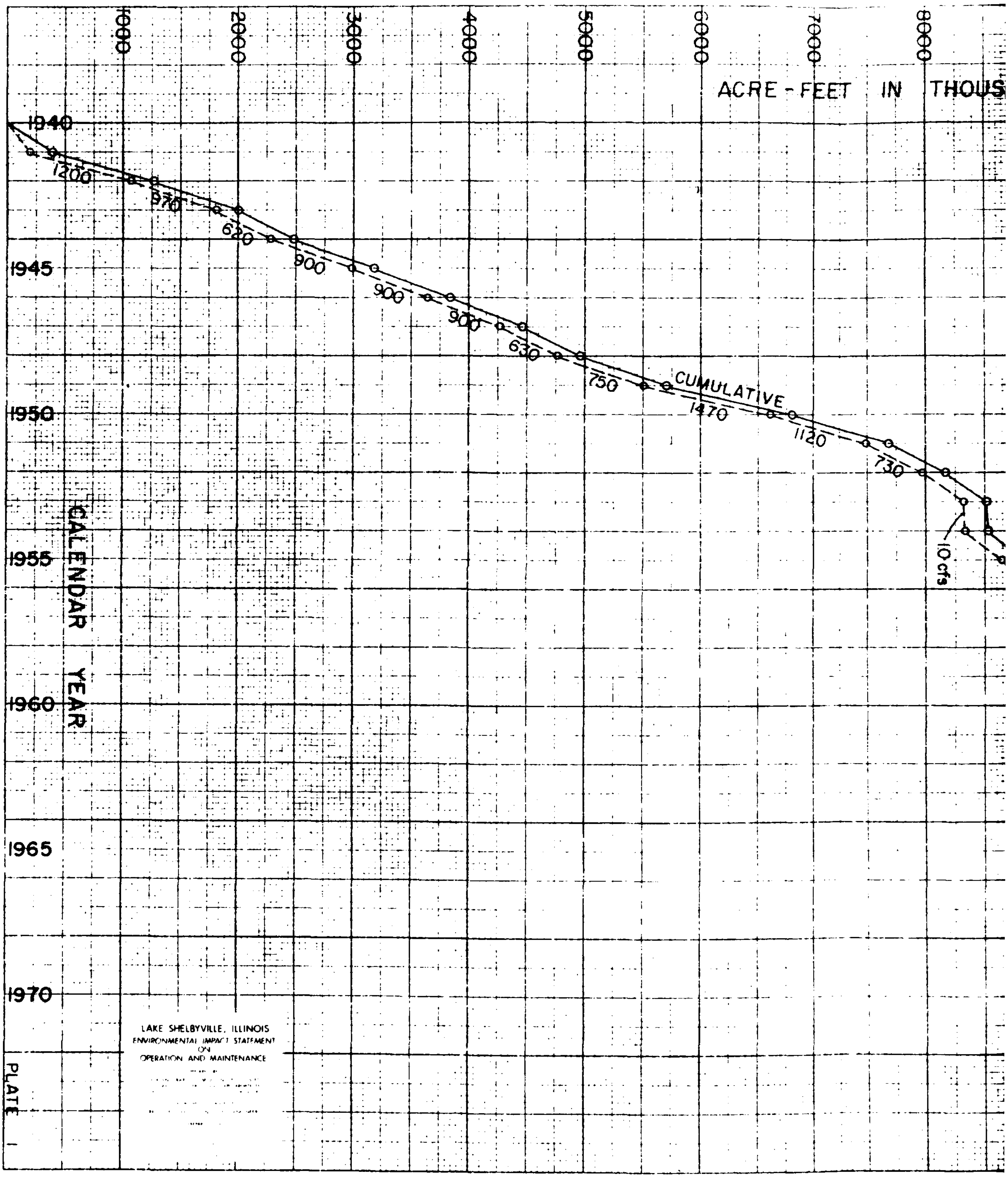
Impact. The advantages to developing an alternate operating program suggested by the above guidelines, are several. Part III of this report shows that for the 30 years of record, the natural streamflow equalled or exceeded 1,800 cfs a few more days than it would have if the dam had been constructed and the releases controlled. The proposed operating plan is aimed at minimizing the number of days or occasions on which releases from Lake Shelbyville exceed 1,800 cfs. Furthermore, limiting the number of occasions on which the pool will fluctuate between 610 and 596 will lessen bank erosion and damage to

trees and other vegetation above 610. Holding the pool below 610 as much as possible throughout the recreation season (which extends approximately from May through September, inclusive) will be an additional great advantage of this alternate operating program; 3.2 inches of runoff storage are available between the operating elevations suggested in the guidelines. The demand for greater storage can be qualitatively evaluated from the highest monthly average runoff. Based upon the period 1941 through September 1959, inclusive, April had the highest monthly average runoff, with 1.66 inches.

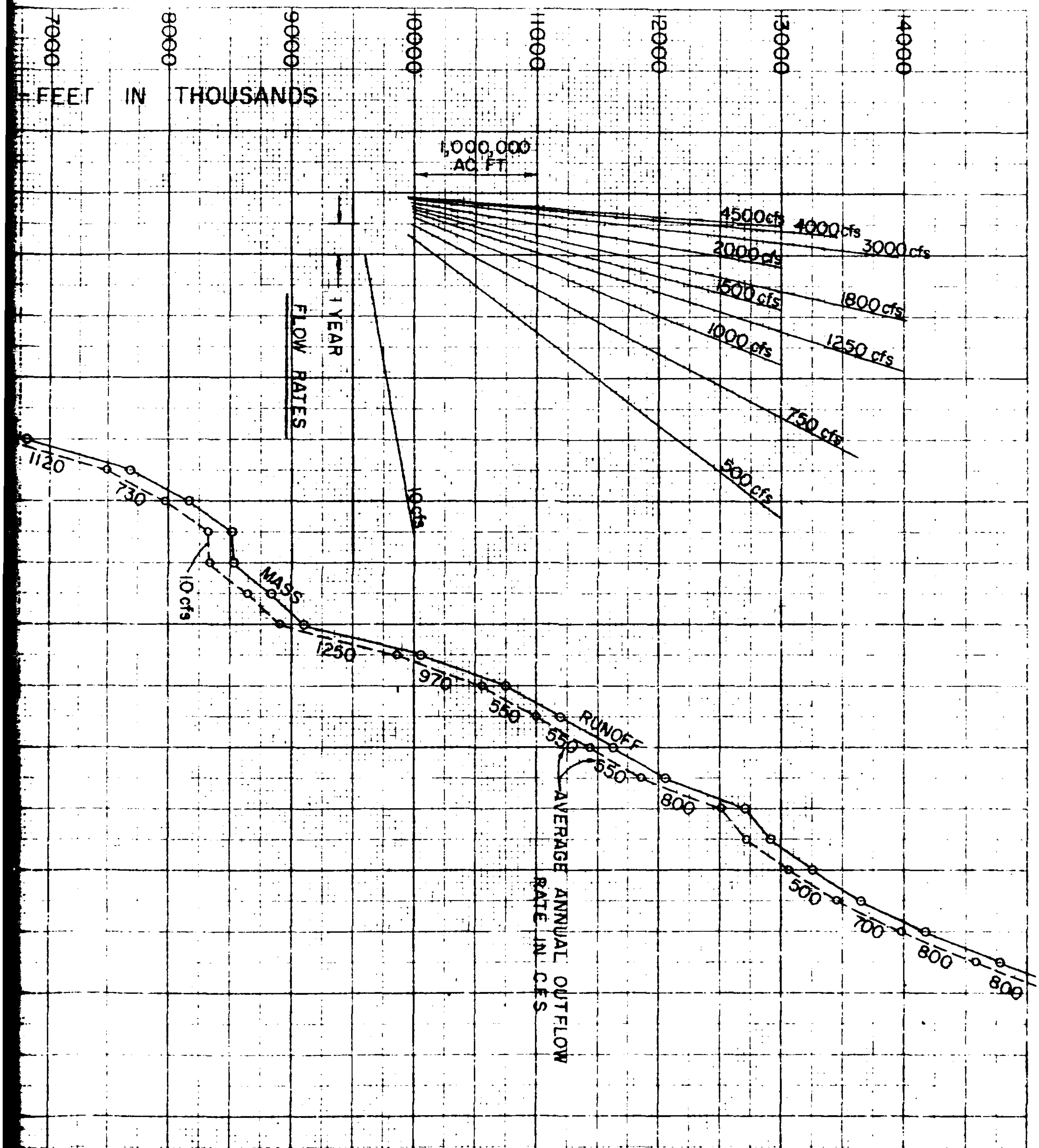
Further support for an operating goal with the maximum release of 1,800 cfs most of the time is brought out on Plate V-1. This plate shows actual mass runoff (the solid line) as accumulative acre-feet for the calendar years 1940 through 1968, inclusive. The dashed line is uniformly 248,000 acre-feet below and parallel to the actual record runoff line. This 248,000 acre-feet represents 210,000 acre-feet of storage below pool elevation 599.7, plus a year's allowance for evaporation at the average annual rate. The average annual rates of flow which would be necessary to maintain the storage of 210,000 acre-feet below 599.7 are shown adjacent to the dashed line. The drouth of 1952-1955 had average rates of annual outflow considerably below 500 cfs. Actually, only four of the 28 years indicate an average rate in excess of 1,000 cfs with the maximum 1,470 cfs in 1949. During the period 1941-1959, the average daily flow at the Shelbyville gage was 815 cfs. An additional advantage of this program is the benefits which will result from fewer, shorter pool stages above 610. As a consequence, recreational benefits, all of which can be enjoyed with the pool at or below 610, can prevail over a greater proportion of time each year. Advantages accrue in minimizing additional bank erosion, inasmuch as concentrating the fluctuation between 596 and 610 would result in an ultimate stabilization of the banks within this range of fluctuation. Damage to trees and other vegetation due to pool fluctuations would be reduced also. Limited pool fluctuations should further benefit the fish life and have beneficial effects on small mammals that burrow and create dens at the water's edge.

Disadvantages to the proposed operating plan are that the period of bankfull streamflow below the Shelbyville dam site would be longer. Because most of the flow releases would result in bankfull conditions in the main Kaskaskia channel, the tiled farm drains would be flooded more often, preventing out-drainage of the tiled fields. Occasionally, 1,800 cfs are released during periods of considerable rainfall below Shelbyville. This release, supplemented by inflow from lateral tributaries below the dam, would cause overbank flooding with consequent damages during the agricultural season.

The alternate operating program discussed above would have some advantages over that presently used for Lake Shelbyville:



ACRE - FEET IN THOUS
1000
2000
3000
4000
5000
6000
7000
8000
1940
1945
1950
1955
1960
1965
1970
CALENDAR YEAR
1200
970
620
900
900
900
630
750
CUMULATIVE
1470
1120
730
10 cfs
LAKE SHELBYVILLE, ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
ON
OPERATION AND MAINTENANCE
PLATE



CUMULATIVE MASS RUNOFF

PLATE V-1

Summary.

Effect of Operation and Maintenance	
On Project Purposes	On Environment
Flood Control - Fair to Good	Total - Good
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Good	Social - Good
Recreation - Good	Economic - Fair to Good

Implementing this alternative would enhance the lake environment and upstream agriculture, but it would adversely affect downstream agriculture. It should be considered.

Alternative No. 2:

Reduce the Amount of Flood Protection for Kaskaskia River

Description. This alternate operation and maintenance scheme would not afford much flood protection for the Kaskaskia River, particularly between the Shelbyville dam and the upper end of the Carlyle Lake near Vandalia. It would retain, as a primary purpose, flood protection for the lower Mississippi River. However, flood protection for the lower Mississippi cannot avoid providing some flood protection for the Kaskaskia River Valley. Under the current plan of operation, the flood protection that Lake Shelbyville gives the Kaskaskia River is principally a reduction in the peak flows which would occur in nature. It also supplements the flood protection that Carlyle Lake renders for the lower reaches of the Kaskaskia.

Rigorously interpreted, this alternate proposes that Lake Shelbyville be used to store local runoffs until the Mississippi River starts falling appreciably.

The following would be general guidelines for this alternative:

(1) Maintain the pool elevation at 599.7 (the top of the joint-use pool).

(2) Except during periods when it is necessary to maintain the pool elevation (to offset evaporation or drawdowns for navigation or water supply, particularly during dry periods), releases would equal inflows up to releases of about 25,000 cfs (approximately 25-year frequency of recurrence on the open river discharge frequency curve).

(3) For flows exceeding 25,000 cfs, cut back the releases to 5,000 cfs and store the excess. Handle its drawdown in accordance with the current plan of operation and schedule of releases termed Plan VII.

(4) For great storms with peaks less than 25,000 cfs inflow and release, there should be no constraints on releases from Shelbyville. Draw down to joint-use pool level as quickly as is feasible.

(5) At times when the pool is below 599.7 releases should be reduced to the minimum navigation requirements and water supply needs (should any such latter needs develop). These would be met from the joint-use pool, but no releases other than those required under the project authorization should be made when the pool is below 599.7.

Impact. Fluctuations in pool level, except for storms of 25 to 50 year frequency interval, could be maintained near normal pool elevation. Only in extremely dry periods when evaporation, navigation and water supply withdrawals call upon the joint-use pool, would it drop below its design level. These periods are rare, as the design information shows. A relatively stable pool would result in maximum benefits to recreation and minimize damages to shorelines, vegetation, and to fish and wildlife. A further advantage would be a narrowing of the vertical extent of bank erosion that damages vegetation, trees and water's-edge wildlife. With fewer fluctuations, less shoreline would be alternately inundated and then exposed.

The disadvantage of this operating alternative would be that the lower Kaskaskia Valley downstream of Shelbyville would again experience about the same flow regimen as existed prior to the construction of the Shelbyville dam.

To compare this with present operation and maintenance, this alternative is rated as follows:

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Fair to Poor	Total - Good to Fair
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Fair to Good	Social - Good
	Economic - Fair to Poor
Recreation - Good	

In conclusion, this alternative is attractive, but the increase in agricultural damages downstream from Shelbyville makes it unacceptable.

Alternative No. 3:

Reduce Flood Protection for Mississippi River.

Description. This alternative would upgrade the available storage for flood control of the Kaskaskia River between Shelbyville and Vandalia. This would be so because most releases from Shelbyville could be minimized to keep them well within bankfull capacity of the main stream

The following should serve as criteria and guidelines as well as goals to implement this alternative:

(1) Hold pool at elevation 599.7 (top of joint pool).

(2) Limit pool fluctuations between elevations 610 (storage 345,000 acre-feet), and 596 (storage 168,000 acre-feet).

(3) 177,000 acre-feet of flood control storage, which is equivalent to 3.21 inches of runoff, are available to control the majority of the more frequent floods.

(4) During agriculturally sensitive seasons downstream from Lake Shelbyville, limit releases to a maximum of 1,000 cfs whenever the pool is within the limits given in (2).

(5) During winter (non-agriculturally sensitive period), limit releases to a maximum of 4,500 cfs and hold pool at or above 596.

(6) Change releases as slowly as possible to minimize sudden significant drops or rises in pool elevation.

(7) Whenever heavy rains occur over the watershed below the Shelbyville dam site, during the active farming periods of the year, cut back the releases from Lake Shelbyville, with the lower minimum release 10 cfs.

(8) At times of exceedingly rare storms above Shelbyville so great that some of the guidelines above given cannot be adhered to, follow the regulations in the Lake Releases Plan VII (as developed in the 1969 Joint-Use Analyses for the Regulation of Lake Shelbyville and Carlyle Lake). This alternative is similar to the first alternative, but with considerably lower release called for most of the time, the pool fluctuations would be more frequent and of greater vertical extent and duration.

Impact. The principal advantage would accrue to the agricultural lands in the Kaskaskia Valley below Shelbyville.

The disadvantages are all of those that are related to or caused by pool fluctuations, which necessarily would be more frequent with lower releases as a controlling factor.

Flexibility of pool releases would be immensely enhanced if local interests in the Kaskaskia Valley, implemented the levees called for in the original project authorization. Some locations would need pumping stations for handling interior drainage back of the levees during high flows in the constrained channel. The tile drainage could be delivered to separate, small forebays with separate pumps for discharging the runoffs from the tiled fields. With flooding eliminated in the Valley between Shelbyville and Vandalia, the operation of Lake Shelbyville could be based upon releases within a wide range. This, in turn, could be reflected in much greater stability of pool elevations and a minimization of fluctuations with all attendant benefits.

This alternative operation and maintenance plan is rated as follows:

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Fair to Good	Social - Good
Recreation - Fair	Economic - Fair

In conclusion, downstream agriculture would benefit, but pool level fluctuations would be a disadvantage. Improved tile drainage and levee construction to protect farmlands would make this alternative attractive.

Alternative No. 4:

Flexibility of Pool Releases.

Description. The multi-purpose goals for Lake Shelbyville include, in addition to flood control, navigation, water supply, fish and wildlife, and recreation. Some of these purposes conflict and compromises must be made to achieve the most desirable, equitable distribution of benefits in each of these five areas. This makes maximum flexibility desirable in an operation and maintenance plan or program.

Plate I-3, which illustrates the monthly lake regulation and seasonal activities, indicates why increased flexibility could be of considerable advantage. There are two desirable types of flexibility which should be incorporated in an alternative operating plan. The first of these is time flexibility which should be based upon current downstream and upstream conditions when departures from regulations might result in more satisfactory operation of the storage pool. For example, the various agricultural periods indicated on Plate I-3 show when agricultural operations ordinarily occur. However, a mild winter

might well cause farmers to plant oats earlier. At times, harvesting can be as early as mid-October. Current regulations only permit pool stage objectives (and related release rates) to be changed in the early part of April and again in the first half of November. This alternative proposes that while current guides may be retained, the plan of operation should permit pool elevation fluctuations earlier or later than the existing plans of operation presently allows. (It is representative of average annual conditions). With flexibility available in the operation, agricultural interests can have decisions based on the season's actual timing. There will be less overbank flooding and, at times, better functioning of tile drainage outlets. Also, time flexibility would be desirable to sustain the pool level in the fish spawning season. (See Plate I-3.) The pool should be held as nearly constant as is practical through that period, even if doing so departs somewhat from the existing operations program.

The second basis for flexibility concerns rate releases. In many respects, these two varieties of flexibility, i.e. time flexibility and rate release flexibility, are unavoidably interrelated. For example, to hold the pool reasonably constant through the fish spawning season would mean varying the releases according to the inflows in order to maintain a constant pool level. A second time at which release flexibility can be advantageous is during periods of ice cover when it would be harmful to fish life to draw down suddenly.

Impact. The advantage of this alternative program of operation and maintenance is principally that it can respond to the specific variations inherent in each particular season or year, rather than adhering to an average annual pattern. One gain is upstream pool control with minimization of fluctuations and downstream agriculture gains through releases correlated to the actual beginning and end of a particular year's agricultural activities.

The disadvantage is that operating personnel must make more frequent decisions stemming from increased flexibility.

Actually, this alternative supplements the prior alternatives and should be incorporated in each of them.

For comparative purposes, the effects of this flexibility alternative are rated as follows:

Summary.

Effect of Operation and Maintenance
As Supplementing the Present or Proposed Alternative Plans

On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Fair to Good	Social - Good
Recreation - Fair to Good	Economic - Fair to Good

In conclusion, this alternative should be considered because it allows modified releases in response to specific seasonal climatic variations.

Alternative No. 5:

Leave the Dam in Place, but Perform Only Essential Functions Necessary to the Integrity of the Dam and the Public Health and Safety.

Description. This alternative proposes no lake level regulation. The pool would remain fairly constant at elevation 593, the top of the spillway. With normal precipitation, water would flow uncontrolled over the top of the spillway so that outflow from the dam would equal inflow from the drainage basin above it. During drouths, the water level would fall below the spillway, and the Kaskaskia River would not receive water from the upper drainage basin.

Impact. The Kaskaskia Valley below Shelbyville would suffer severe adverse impacts if this alternative were implemented. All flood control aspects of the project would be eliminated, leaving farmlands unprotected. Fish, vegetation and benthic organisms in the river would be damaged or killed during drouths because stretches of the Kaskaskia River would dry up below the dam. No water could be stored and released to aid navigation.

The relatively constant pool level provided by this alternative would benefit wildlife and vegetation in the lake area. Biological communities would no longer be subject to fluctuating water levels and bank erosion would be much reduced.

Summary.

Effect of Operation and Maintenance	
On Project Purposes	On Environment
Flood Control - Poor	Total - Poor
Navigation - Poor	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Fair to Good	Social - Poor
Recreation - Good	Economic - Poor

In conclusion, this alternative is unacceptable because unregulated flow would have severe adverse impacts on both the agricultural lands and the Kaskaskia River below the dam.

Navigation Alternatives

One of the project objectives is to provide water - in coordination with Carlyle Lake - to maintain navigation on the lower 50 miles of the Kaskaskia and to supplement Mississippi River flow during drouths. because the lower Kaskaskia navigation project is not finished and because rainfall has been more than adequate, Lake Shelbyville has not been operated to aid navigation.

Alternative No. 1:

Supply Water Primarily for the Kaskaskia Navigation Project.

Description. Water would be released primarily to supplement Kaskaskia River flow during low water periods. Because it would seldom be necessary to release water to aid navigation on the Mississippi, Lake Shelbyville's pool level would remain higher during drouths.

Impact. The higher minimum pool levels would favor fish and wildlife. Water supply and recreation would benefit from the greater volume of water retained in the lake. The economic impact on Shelby and Moultrie Counties should be favorable because people could continue to use the lake during severe drouth periods.

The principal adverse impact would occur outside the drainage basin; that is, the Mississippi River below its confluence with the Kaskaskia would not receive much supplementary flow unless it came from Carlyle Lake.

Summary.

Effect of Operation and Maintenance	
On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - Fair	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Fair to Good	Social - Good
Recreation - Fair to Good	Economic - Fair

In conclusion, implementing this navigation alternative during drouths would have a favorable impact on the Lake Shelbyville area. It might be considered as an option.

Alternative No. 2:

Subordinate Navigation to Other Project Objectives

Description. Water for navigation would be stored and released only insofar as it did not interfere with operation and maintenance for the other four project purposes. During the winter, the pool could be drawn down to 590 feet, rather than held at the 596 foot level specified for navigation water storage. During dry periods, only the minimum amount of water (10 cfs) would be released from the lake.

Impact. Flood control, fish and wildlife, water supply and recreation would benefit if navigation was subordinated. Greater pool drawdown in the winter would provide more flood water storage capacity in the lake, and maintaining the highest possible lake levels during drouths would improve water quality, protect fish and wildlife,

and provide continuing water recreation. The socio-economic impact on Shelby and Moultrie Counties would be favorable.

Navigation on the lower Kaskaskia would be hindered unless Carlyle Lake releases could sustain a navigable channel. For the lower Kaskaskia basin, the socio-economic impact would be adverse.

Summary.

Effect of Operation and Maintenance On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - Poor	Physical - Fair to Good
Water Supply - Good	Biological - Good
Fish and Wildlife - Fair to Good	Social - Good
Recreation - Fair to Good	Economic - Fair

In conclusion, although navigation would be adversely affected in times of drouth, this alternative benefits the other four project purposes and is therefore attractive.

Fish and Wildlife

One specific alternative is suggested. Other alternatives to existing operation and maintenance activities affecting fish and wildlife can be considered under the broad categories of more management or less management.

Alternative No. 1:

Establish a Commercial Fish Harvesting Program

Description. Lake Shelbyville's waters contain high concentration of nitrates and phosphates, both of which are utilized by algae. For commercial fishing, the nutrient-rich surface waters entering the lake could be an advantage, encouraging algae which, in turn, would serve as a primary food source for a variety of tolerant, adaptable, herbivorous, warm water commercial fish. Such species are a significant protein source, and would be commercially harvested and processed.

Catfish, gar, white or yellow bass, spotted bass, buffalo, carpsucker, gizzard shad, largemouth bass, drum, bluegill and crappie are fresh water fish that can grow satisfacotrily in waters as warm as 90°F., according to the Federal Water Pollution Control Administration. Lake Shelbyville's water temperature is well below the upper limit established for satisfactory warm water fish growth. (See Table V-1, and Plate V-2).

In order to insure a successful fishery, the present operating procedures, which allow considerable pool level fluctuation for flood water storage, would be modified. Pool levels would be held nearly constant during spawning seasons.

Bec se few Midwestern impoundments support commercial fisheries, there are no records that show numbers and pounds of commercial fish harvested annually from a lake such as Shelbyville. In order to reduce their abundance, such fish are often poisoned and thereby lost as a protein source.

It is difficult to estimate the standing fish crop in a lake because the population cannot be sampled adequately. However, some general projections can be made by using 1974 Carlyle Lake commercial fish catch statistics determined by the Illinois Division of Fisheries. Between March 4 and April 12, 218,614 pounds of fish were netted, having a commercial value of $30,990. Almost all of the fish caught were commercial fish with carp accounting for 24.9 percent of the catch and buffalo for 65 percent. Based upon this rvey the State Division of Fisheries is recommending that the commercial fishing program be continued in 1975, from February through April.

When Lake Shelbyville's standing commercial fish crop is estimated, the harvest from it might warrant building a small fish processing plant in either Shelbyville or Sullivan. If not, the catch might be sold and shipped to food processors in the area.

Impact. Although adaptable warm water commercial fish would be encouraged, sport fishing should not suffer, and might even improve. Coarse fish would be harvested, limiting their abundance, and game species would benefit from a relatively stable pool level during spawning season.

Because the harvesting program would create jobs, it would benefit the area economically. If a fish meal processing plant were built in Shelbyville or Sullivan, it, too, would have a favorable economic impact.

Summary.

Effect of the Proposed Alternative

On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Good	Social - Good
Recreation - Fair	Economic - Good

In conclusion, this is an attractive alternative and definitely should be considered.

Alternative No. 2:

Increased Management

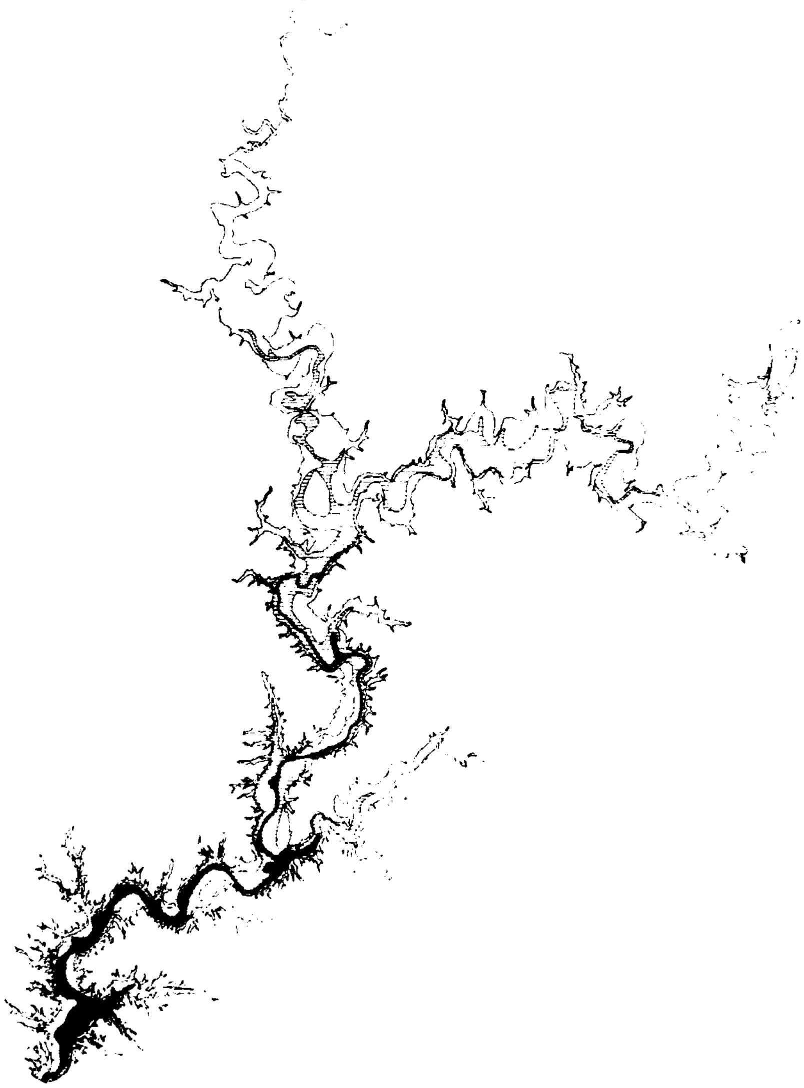
Fish. Better stocking success could be achieved if the nursery pond system were expanded and improved. Several subimpoundments of the

Table V-1

AVERAGE TEMPERATURE OF
LAKE SHELBYVILLE WATER*

Station, Depth	Spring	Summer	Fall	Winter
VIII, Surface	59.9°F.	78.8°F.	61.7°F.	39.0°F.
IV, Surface	59.9	80.7	62.2	36.8
III, Surface	59/6	80.9	63.4	35.5
II, Surface	58.6	79.7	65.3	37.6
Average	59.1	80.0	63.2	37.2
IV, 5 m	58.1	--	--	36.4
III, 5 m	58.4	--	62.8	35.5
II, 5 m	56.0	--	65.3	37.4
Average	57.5	--	64.1	36.4
III, 10 m	58.2	--	--	35.5
II, 10 m	54.7	--	--	37.4
Average	56.5	--	--	36.5
II, 15 m	--	--	--	37.4
Average	--	--	--	37.4

*Average seasonal temperature computed for waters with dissolved oxygen sufficient to support diverse warm water biota (5mg/1, or more, for 50 percent of the readings).



DEPTH OF WATER

DEPTH BELOW NORMAL POOL (EL. 599.7 M.S.)

0' - 20' DEPTH
20' - 40' DEPTH
40' - 60' DEPTH

2

PLATE V-2

lake would have to be isolated from changes in lake level. The stocking of larger fish which would result through the use of sub-impoundments would improve fishing.

During 1973, it was possible to fulfill flood control purposes and at the same time provide the slow rise in pool elevation which is desirable for young fish growth after they hatch. If spawning success were considered sufficiently important, pool stabilization for the benefit of fish reproduction could be made mandatory during May 15 to June 15.

If fish population dynamics in the lake were better understood, management might be more effective. The time and skill required for comprehensive studies would be costly, and the program should also be backed up by funds for implementing recommended management operations.

Wildlife. Additional management could be implemented to increase the diversity of habitat types available. Sections of upland could be managed for prairie restoration, native animals reintroduced, and hunting restricted within these areas. Small wet weather and permanent ponds could be constructed in some areas to encourage amphibians and other wildlife.

Management of fee lands for the benefit of hunters could be intensified. In the extreme, this management approach could transform the area from a semi-natural environment to a game farm in which some non-game species would not be adaptable to the management methods. The increased hunting pressure in such a situation could encourage animals to become more secretive than usual. This would reduce the value of the area to non-hunters.

Inventories and studies of terrestrial animal populations could be implemented to provide better data about the success and interactions of different species.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - None	Physical - Fair to Good

On Project Purposes	On Environment
Water Supply - None	Biological - Good
Fish and Wildlife - Good	Social - Good
Recreation - Fair	Economic - Fair

In conclusion, more intensive fish and wildlife management would be more costly, but would improve, sustain, and increase diversity of wildlife habitat and populations with subsequent increase in recreational opportunity.

Alternative Actions

Decreased Management

Fish. Any or all of the programs for management of the fishery could be discontinued. Some game species would probably be able to maintain good populations, but lack of background data would hamper any future management in response to an emergency situation, increased recreational demands or other conditions that might result in a change of philosophy.

The total dollars spent annually to manage the fishery are slight compared to the benefits obtained from the number of people using the lake for fishing. Because management helps to increase the recreational value of the lake, with very few disadvantages, non-management is not recommended.

Wildlife. Cessation or decreased application of the wildlife management practices designed to maintain plant communities at an early successional level would result in lower density of some animal species and eventually, as climax forests developed, in a lower species diversity. A benefit of this alternative would be the eventual re-establishment of a climax forest community similar in character to those which once covered the river valleys of central Illinois. An operational benefit would be a savings of public funds presently spent for wildlife management. Recreational benefit to hunters of other than forest species would be reduced, but recreational benefits to people interested in experiencing natural forests would be enhanced.

Summary.

Effect of Operation and Management

On Project Purposes	On Environment
Flood Control - Good	Total - [illegible]
Navigation - None	Physical - [illegible]
Water Supply - None	Biological - Fair
Fish and Wildlife - Poor	Social - [illegible]
Recreation - Fair to Good	Economic - [illegible]

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ENVIRONMENTAL IMPACT STATEMENT OF OPERATION AND MAINTENANCE, LA--ETC (U)
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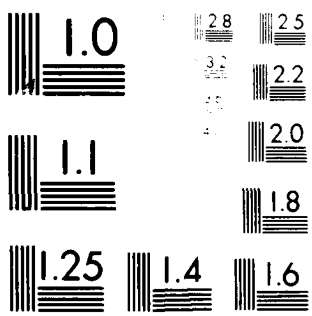

1.0
2.8
2.5
3.2
2.2
2.0
1.1
1.8
1.25
1.4
1.6

In conclusion, alternative No. 3 is unacceptable since fish and wildlife conservation is an authorized purpose of the project and the Corps is obligated to develop and implement sound land management practices which will insure a continued diversity of wildlife population on Corps lands for recreational use. Selecting and implementing the most beneficial set of alternatives to existing and proposed management proposals would increase project benefits to fish and wildlife conservation and, indirectly, to recreation.

Recreation

Recreation provides 72 percent of all benefits derived from the project. A wide variety of operation and maintenance alternatives can substantially affect the role recreation plays. Seven alternatives are presented which vary from reducing recreation to a very minor level to substantially increasing the project's recreational impact.

Alternative No. 1:

Recreation to be Reduced to a Minor Project Purpose.

Description. With recreation serving a minor role, flood control becomes the principal project purpose. Water levels would fluctuate to provide maximum flood protection along the Kaskaskia River below Shelbyville. No additional recreational facilities would be built and existing facilities would be used when and where operable. Present operation and maintenance practices would be continued.

Impact. There are numerous disadvantages to this approach. The principal problem is that the 1973 cost benefit analysis estimated recreation return at just under five million dollars. Recreation currently provides 3.5 times more economic return than flood control.

The existing recreation facilities play an important regional, county and local function. The public's response to activity curtailment would be considerable, and recreational pressures would be transferred to other facilities, particularly Carlyle Lake.

The Corps and State have already made a substantial recreation commitment. The Corps has spent 6.8 million dollars; 4 1 million dollars are projected for future 1974-1975 development. The State of Illinois has spent 2.2 million dollars on recreation development. To realize a satisfactory return, the facility must be used at a very high level to compensate for the maintenance costs required to render the facility usable after flooding; the extra wear and tear caused by inundation; and the recreational benefits lost because the facility was inoperative. Due to the impact of high water,

and because the facilities have been in operation less than three years, approximately 60 percent of the investment to date would be lost.

The project's semi-natural character would be greatly altered if this alternative were put into effect. Within 10 years bank and soil erosion and loss of trees could destroy much of the area's appeal.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Good	Total - Poor
Navigation - None	Physical - Poor
Water Supply - None	Biological - Fair
Fish and Wildlife - Fair to Good	Social - Poor
Recreation - Poor	Economic - Poor

In conclusion, despite the advantages of complete flood control over the Kaskaskia River below Shelbyville, the benefits would not compensate for a substantial decrease in recreational use and attendance. The site's natural quality and recreational character make the area unique and worth preserving. As a result, this alternative is not recommended.

Alternative No. 2:

Minimize Lake Fluctuations to Within Three Feet of Normal Pool Elevation.

Description. Water levels currently vary substantially from normal pool elevation. This has a detrimental effect on recreation. To realize maximum recreational use of the lake and facilities, the water level should be maintained within three feet of normal pool elevation.

Impact. A relatively stabilized lake level would help preserve and enhance the aesthetic appearance and environmental condition of the shoreline while allowing for maximum use of all recreation facilities.

Substantial bank erosion and tree die-offs have resulted from high water levels. More than 50 miles, or 30 percent, of the shoreline currently is suffering from bank erosion. Shoreline trees below elevation 608.8 are being killed because the water level was maintained at this level for five months during 1973. No effective and financially practical technique has been developed to control the effects of water level variation. An attractive shoreline is essential. To accomplish this a controlled water level is necessary.

High water levels curtailed swimming and boating during the 1973 recreational season. The swimming beaches were officially closed for the entire season, except for the final two weeks of September. Boat launching ramps were inoperative for 35 percent of the season, primarily in May and August. As a result, swimming participations declined 23 percent while boating participations dropped 30 percent during the 1973 peak use month as compared to 1972.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Poor	Total - Fair to Good
Navigation - Poor	Physical - Good
Water Supply - None	Biological - Good
Fish and Wildlife - Good	Social - Fair
Recreation - Good	Economic - Poor

In conclusion, this alternative is recreationally very attractive. However, because of the impact of flooding along the Kaskaskia River below Lake Shelbyville, this alternative is not recommended.

Alternative No. 3:
Develop a Wide Variety of Appropriate Facilities to Encourage Maximum Recreational Use.

Description. To provide maximum recreational use, increased facilities should be provided both in number and variety. A visitor center could introduce visitors to the project by explaining what facilities are available and alerting them to unique points of interest. Tours of the dam, a restaurant and a lodge, a golf course, a nature study program composed of an ecology center, displays, nature trails and primative areas would be appropriate. Increased camping facilities could allow for both a primitive and developed camping experience for tenters and camping vehicles.

Activity and facility selection should be determined on the following basis: Are Lake Shelbyville's site characteristics better suited for this use than any other comparable area? Is the proposed activity in keeping with the prevailing character of the project? Will development of the facility have a detrimental impact on other recreational uses? Does the proposed activity have sufficient public appeal to warrant development?

Impact. Adequate land areas exist to accommodate this development. The project area is composed of approximately 23,200 acres of land and 11,100 acres of water surface. Currently, less than one-third of all developable recreational land has been utilized for this purpose. However, the project lands form a narrow band surrounding the lake. To protect the lake from conflicting uses additional

land acquisition may be necessary. This is particularly essential if a major land-oriented facility is provided.

To encourage weekday use and to extend the recreational season, a variety of overnight accommodations is needed. Currently, only camping is provided. The average camper remains at the project for 4.4 days. Average camp participations in the Shelbyville region range from between 1.5 to 2 occasions per adult person per year. This represents a relatively low regional participation rate. While gaining in popularity, camping continues to appeal to a minority of the population. Development of lodge facilities would offer the public an alternative to camping. Such facilities would attract visitors from more than 50 miles away, encouraging them to remain at the project over an extended period. This would help to disperse the heavy visitor attendance experienced on Friday, Saturday and Sunday of the recreational season. By keeping visitor counts at a consistently high level during the week and the off season, such facilities can provide greater recreational return.

Increased visitor attendance could require major alterations in vehicular circulation. The existing roads cannot accommodate the anticipated traffic volumes safely or efficiently. Increased control over vehicular access is essential to coordinate demand and facility availability.

As development levels increase in scale and by providing a wider variety of attractions, maintenance requirements would increase at a greater rate than development. Maintenance administration becomes more complex and increased visitor numbers require a more intensive maintenance program.

To ensure use compatibility similar facilities should be concentrated in one area. Comparable development levels and design requirements should help determine compatibility.

The incompatibility of motorcycles and all terrain vehicles with other recreational activities has restricted their use in most recreational areas. Because of the noise level, soil instability and difficulty in regulating and controlling these vehicles, their use is not recommended. Such development would contradict the desired goal for preserving a seminatural environment.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environement
Flood Control - Good	Total - Good
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Fair
Fish and Wildlife - Fair	Social - Good
Recreation - Good	Economic - Fair to Good

In conclusion, this alternative offers a valid procedure for increasing the recreational benefit derived from the project. Implementation of this alternative is recommended.

Alternative No. 4:

Restrict Future Recreational Development and Use to Fishing, Camping, Hunting and Other Primitive Types of Use.

Description. Lake Shelbyville has many landscape features necessary to support fishing, camping and hunting and other primitive recreational uses. Forty-seven percent of the project area is tree covered, nine percent has slopes in excess of six percent, and the linear quality of the lake provides more than 170 miles of shoreline at normal pool. The natural quality of the site makes it a limited and relatively unique resource.

Impact. Because initial project development began at a relatively primitive level, most existing facilities appropriately support the proposed primitive development level. However, man-made swimming beaches, large boat launching ramp facilities, three private marinas, Class A campgrounds, and highly developed day use areas which currently exist at the lake do not contribute to the proposed primitive character of the area. Because it is economically impractical to remove or restrict use of these facilities, large powerboats and extensively equipped Class A campers will continue to use the facilities.

The development of only primitive camping facilities, and intensive nature study program, hiking and nature trails, hunting and other primitive-type uses would not attract or hold many new visitors to the area. Water is the most popular recreational attraction. Both boating and swimming are in the top 10 most popular activities for the 16-county region. Hunting, nature interpretation, hiking and nature trails, and additional fishing and small boating do not stimulate comparable interest.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - None	Physical - Good
Water Supply - None	Biological - Good
Fish and Wildlife - Good	Social - Poor
Recreation - Fair to Poor	Economic - Poor

In conclusion, this alternative should not be applied at Lake Shelbyville because of the relatively limited appeal of the activities. The multiple use attraction of the project should not be altered.

Alternative No. 5:

Confine Future Development to Intensive Urban-Type Recreational Facilities.

Description. The creation of intensive urban type recreational facilities requires a high degree of facility development and financial investment. Intensive development of lodges, restaurants, and specialized recreational facilities would be provided. Supporting recreational facilities would include indoor-outdoor swimming pools, ice skating areas, golf courses, tennis and handball courts, etc. These facilities would be linked to the existing facilities by a system of scenic drives. The scenic drives would contribute to the park-like image while encouraging year-round pleasure driving within the project boundaries. Parking pull offs would emphasize scenic lake overlooks while walking trails would encourage visitor access to unique points of interest.

Special bicycle, motorcycle, snowmobile and equestrian trails could also be provided. The project's relatively flat topography encourages bicycling and an extensive trail system around the lake could link private and public recreational areas. Motorcycle and snowmobile trails should be isolated from the lake and lodges because of the noise level and danger to soil stability. Special control techniques would be needed to restrict their use to these special areas. Riding stables should be located near the lodges, but in isolated areas. The equestrian trail system should avoid public recreation areas. To control trail erosion problems, high maintenance and special surfacing could be required.

Impact. Extensive land areas will be needed for this type of development. While only limited areas have been developed to date, much of the project's fee lands form a narrow band around the lake. Intensive development of major facilities requires substantial land areas with efficient vehicular access from the proposed freeway, and a close relationship to Lake Shelbyville to provide ease of boat access. Relatively large buffer areas would be needed to isolate and protect potentially conflicting uses.

There are currently only two or three project areas which have the capability to satisfactorily support developments of this scale and intensity. These sites should be identified and preserved for future use. Additional land acquisition would probably be necessary to adequately accommodate the proposed development. Operation and maintenance considerations are essential to preserve these sites, and to locate future Corps facilities in relation to them.

A minimum expenditure of 10 million dollars would be required to provide visitors an intensive recreational experience. Because of the specialized type of facilities provided, private concessionaires would play a major role in accomplishing these objectives. Difficulties of private enterprise providing and possibly maintaining public facilities and services will be experienced. These include the

difficulty in locating an interested concessionaire; ensuring a high quality concession service; and the possibility of financial failure.

The intensive use of private funding to provide the proposed facilities would have a definite impact on those using the facilities. Private development is supported by a fee system. Use of the specialized recreational facilities would be paid for by the participant. The fee system discourages participation by low-income groups.

The develpppment of intensive urban recreation facilities will have a definite impact on visitations. The introduction of multi-seasonal facilities, such as lodges and indoor swimming pools, would increase substantially nonseasonal facility use. This would be true particularly during the fall and spring seasons. As the regional significance of the project became apparent, visitor numbers would increase accordingly. Local short-term visitations would be replaced by regional visitors intending to remain over night at the project. This increase in length of visitation would encourage week-day use of the facilities.

Operational and maintenance requirements would have to be increased substantially. Increased visitations, extended use periods, and more sophisticated high maintenance facilities would require a more intensive and specialized operation and maintenance program.

Lake use would oontinue at a high level. Major land facilities would offer an attractive alternative to lake use. Private developers, however, are keenly aware that water and recreation make a successful combination. Concessionaires would exert extreme pressure for maximum lake use. Lake use controls would be necessary.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Good	Total - Fair
Navigation - None	Physical - Poor
Water Supply - None	Biological - Poor
Fish and Wildlife - Fair	Social - Fair
Recreation - Fair	Economic - Good

This alternative is not recommended since the exclusive development of intensive urban-type recreational facilities would displace future primitive rural recreational development. Over-emphasis on intensive concession development could restrict use to higher income groups. Financial discrimination at a publicly owned and operated facility is not in the best interest of the project.

Alternative No. 6:

Eliminate Water Skiing and Provide for Maximum Boating and Swimming Use of Lake Shelbyville.

Description. The lake serves as the project's principal recreational attraction. Based upon 1973 visitor participation rates, 24 percent of all visitors fish, 16 percent boat, 13 percent swim, and four percent water ski. The lake, as a result, is heavily used. Lake use is heaviest during three-day weekends and on Sundays, particularly between 2:00 P.M. and 5:00 P.M. (See Plate V-3.) An estimated 50 percent of all Sunday boating occurs between these hours. (See Plate V-3.) To keep lake use within its resource capacity, visitations should be kept within a maximum of 47,500 daily visitors. The maximum visitor level could be substantially increased by eliminating water skiing.

Impact. Only four percent of all 1973 visitors participated in water skiing, yet the 1,975 estimated daily skiing boats (assuming a peak daily visitor count of 47,500) use visitors are using 32 percent of the project's total water surface area. (See Plate V-4.) By eliminating water skiing and assuming a proportionate increase in other boating types, the lake's carrying capacity can be increased by 5,000 boats. (See Table V-2.) This allows 13,650 additional people to use the lake.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Poor to Good
Fish and Wildlife - Good	Social - Good
Recreation - Good	Economic - Good to Fair

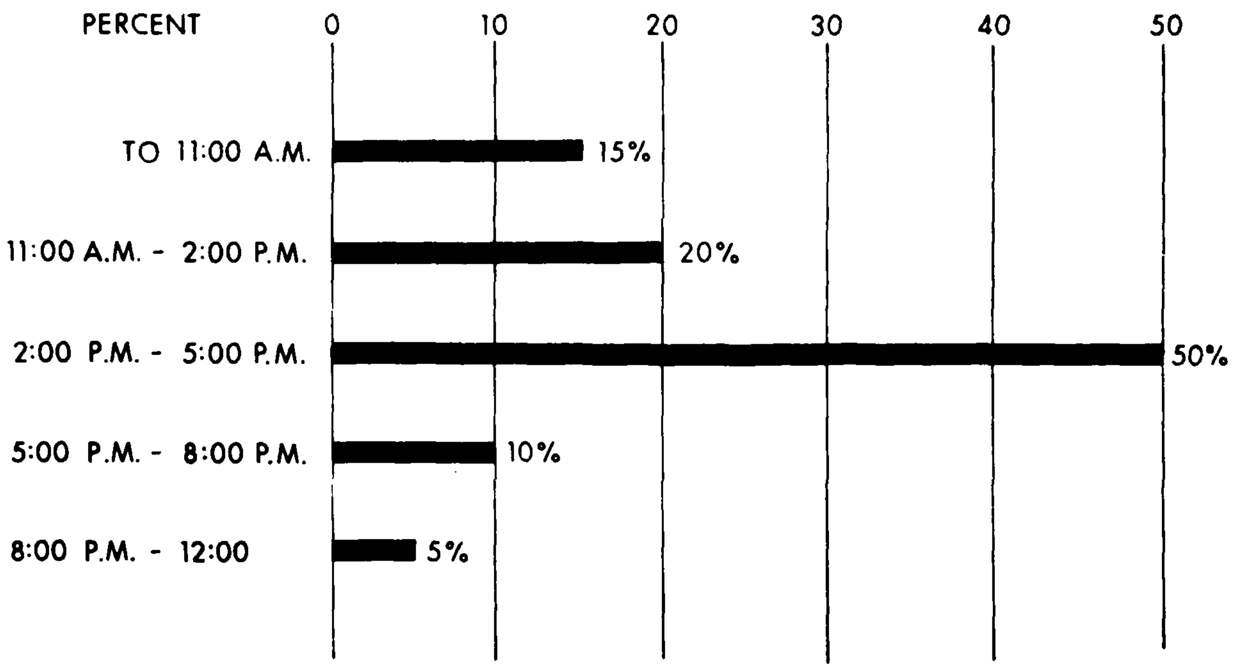
This alternative is not recommended at this time. However, as visitations increase it will become necessary to control visitor levels in order to preserve lake quality and ensure a safe recreational experience. When daily visitations regularly exceed 47,500, water skiing should be prohibited to increase the acceptable visitation rate to 70,400.

Alternative No. 7:

Provide an Alternative System of Boat Ramps and Beaches That Will Allow Lake Use Despite High Water Levels.

Description. Since November of 1972, recreational use of Lake Shelbyville has been adversely affected by high water levels. These water levels have resulted from abnormally heavy precipitation.

SUNDAY BOATING PARTICIPATION



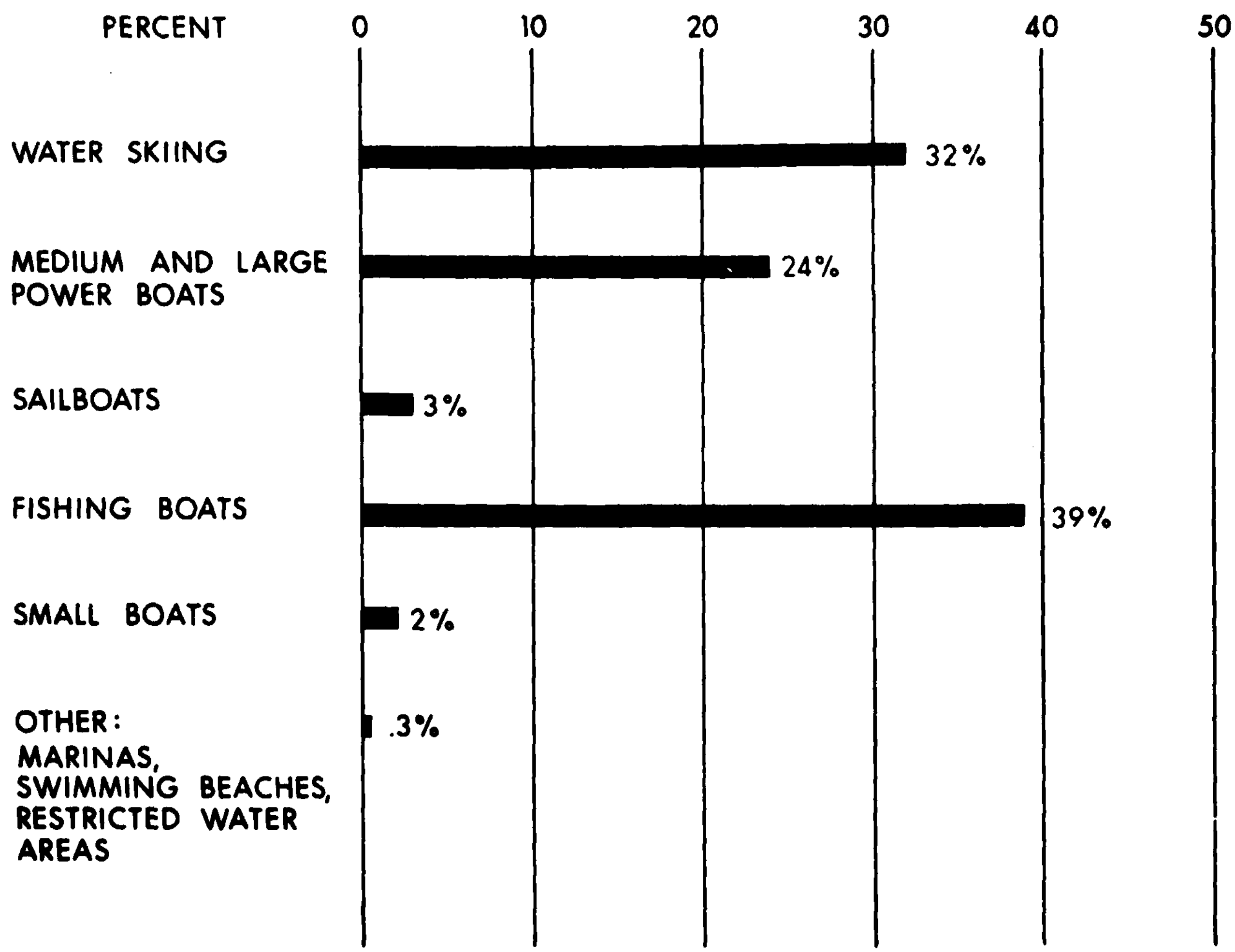
SOURCE:
ESTIMATES MADE BY PROJECT PERSONNEL

LAKE SHELBYVILLE, ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
ON
OPERATION AND MAINTENANCE

PLATE V-3

PERCENT OF LAKE OCCUPIED BY VARIOUS TYPES OF BOATING AND OTHER ACTIVITIES ON MEMORIAL DAY WEEKEND IN 1973

(NOTE: THE ENTIRE WATER AREA WAS FULLY OCCUPIED)



LAKE SHELBYVILLE, ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
ON
OPERATION AND MAINTENANCE

PLATE V-4

Table V-2

MAXIMUM ACCEPTABLE PEAK DAILY USE
ASSUMING WATER SKIING IS NOT PERMITTED

Water Skiing - Restricted, 3,300 water acres available for other uses (increased proportionately).

	Additional Acres	Additional Boats	Additional People Using Lake
Fishing Boats	1,650	4,290	11,583
Sail Boats	165	33	66
Small Boats	528	528	1,320
Power Boats	957	191	2,584
Totals	3,300	5,042	15,553

Additional project visitors	24,800
Four percent of all visitors who previously water skied	1,900
Total additional visitors	22,900
Maximum recommended daily visitor level	70,400 visitations

Because the water level is adjusted to provide flood control and recreational use, the average water level during the 1973 recreational season was 608.8. To compensate for high water levels, duplicate boat launching ramps and larger beaches could be built to accommodate lake use above 610 feet.

Impact. Since normal pool elevation was realized in July, 1971, the swimming beaches have been officially closed 40 percent of all recreational seasons. In 1973, beaches were officially open only nine percent of the season. Boat launching ramps were inoperative 35 percent of the season, primarily in May and August. Annual attendance in 1973 decreased substantially as compared to 1972. This decrease partly resulted from high water levels which rendered the beaches and launching ramps inoperative.

To provide 20 high water boat launching lanes would require an expenditure of approximately $200,000. This assumes that existing car-trailer parking lots could be used. High water ramps could be added to these facilities without endangering the usefulness of the existing launching ramps. This would minimize development impact on the shoreline by using existing facilities whenever possible. This will also minimize maintenance needs.

Four of the five existing swimming beaches are located in camping areas. These man-made facilities are approximately 150 feet long. When water levels rise the narrow beaches are inundated. To allow beach use despite high water, a wider and steeper beach is needed. Since the existing beaches must be almost totally rebuilt, relocation can be accomplished at minimal expense. When building new beaches they should be substantially increased in size to provide greater maintenance efficiency. Beach relocation and enlargement should increase visitor use without increasing maintenance requirements. Unfortunately, beach reconstruction will be necessary whenever high water levels exist.

Summary.

Effect of Operation and Maintenance

On Project Purposes	On Environment
Flood Control - Good	Total - Good
Navigation - None	Physical - Fair to Good
Water Supply - None	Biological - Fair to Good
Fish and Wildlife - Fair to Good	Social - Good
Recreation - Fair to Good	Economic - Fair

Beach relocation and enlargement offer an excellent possibility which should be implemented. Swimming is a highly desired activity and should be provided as long as it is economically feasible.

High water launching facilities are not a realistic alternative. The cost of building duplicate facilities could be justified only if 133,300

visitor days were lost regularly due to high water.

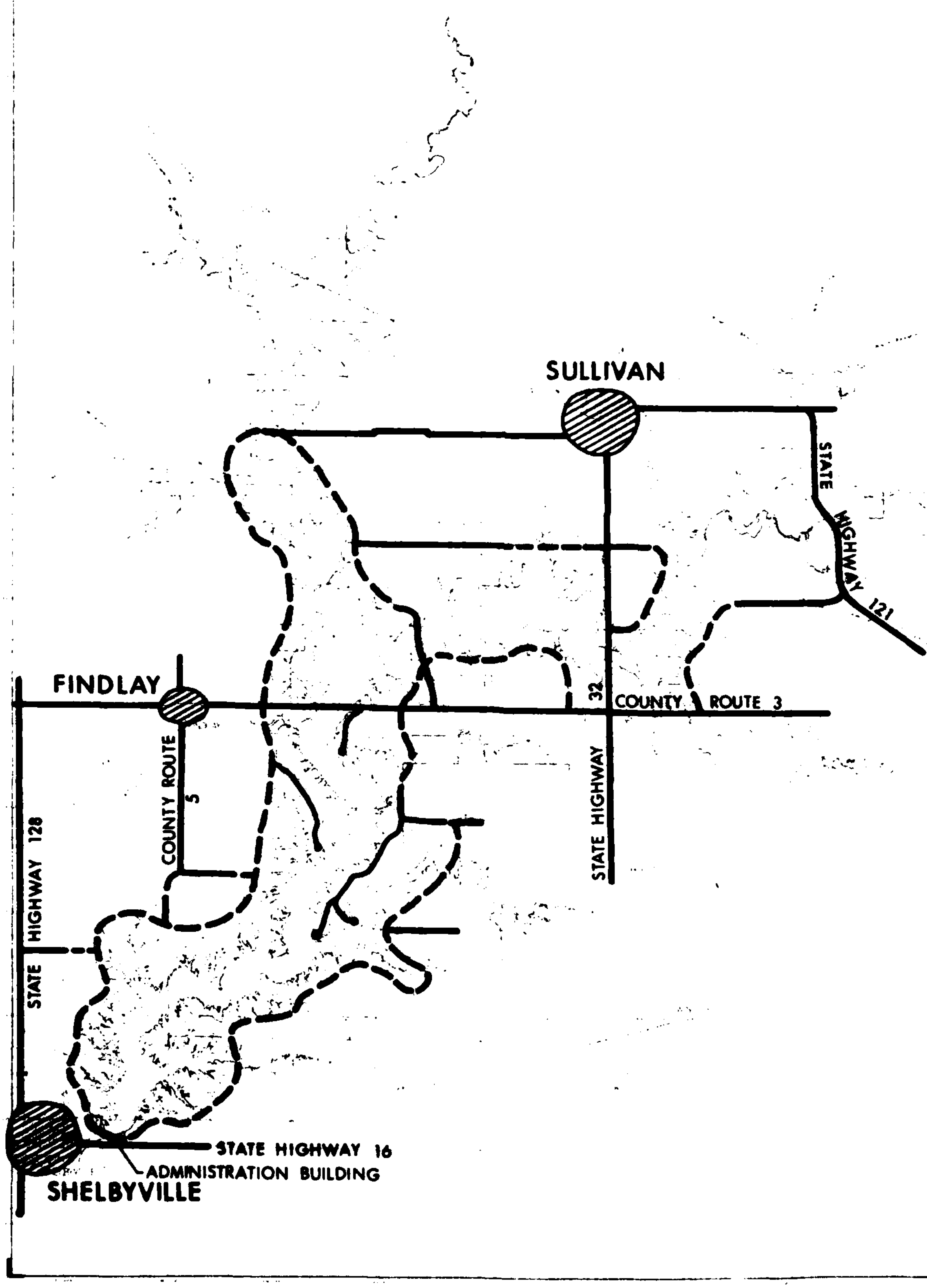
Alternatives to Bring Greater Positive Influence on the Local Economy

There are several alternatives that would make Lake Shelbyville a more dominant recreation facility and a recognized tourist center that would attract an expanded and more varied tourist market. The additional facilities could include:

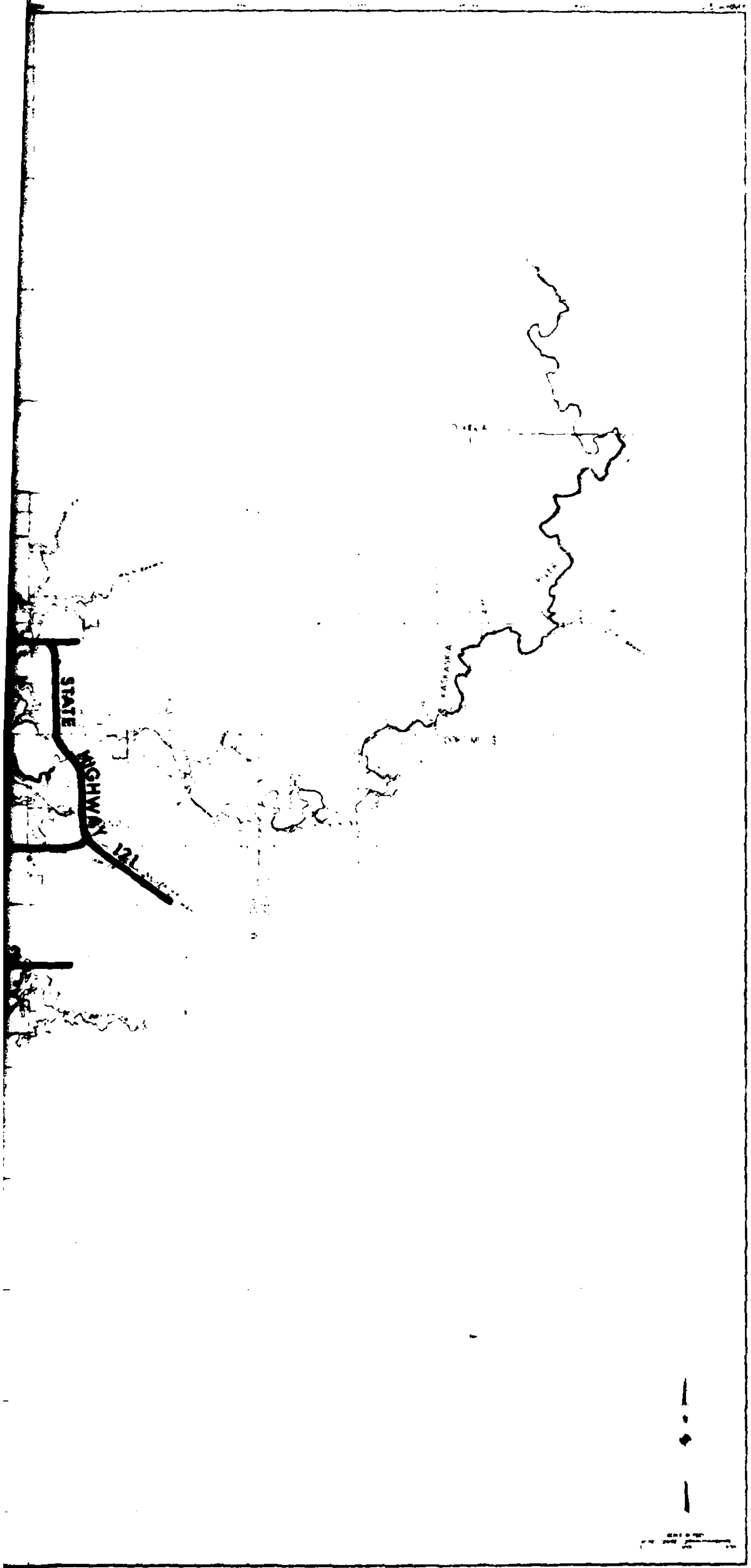
1. An interpretive center that informs the visitor to the lake of the availability and the variety of recreation facilities offered in the Lake Shelbyville area, and provides information of the historic, natural and unusual areas that are of interest in the lake area. Such a center would be a hospitality facility for the visitors and could provide information that would encourage visitors to extend their stay in the area, patronize local establishments, and attract new visitor markets to the lake.

2. One of the most frustrating experiences of a first time visitor to Lake Shelbyville is the complete lack of a continuous route around the lake that affords some views of the lake and permits the visitor to have an awareness of where the various public recreation facilities are located. The number two recreation activity, on national recreational surveys as well as most local surveys, is pleasure driving. There is no opportunity at the lake for a pleasure drive at the present time. (See Plate V-5.)

3. A public relations campaign to inform potential visitors of the variety of facilities, public and private, that are available in the Lake Shelbyville area, would be most desirable. At the present time, the major source of tourist or visitor general information is at the lake itself, not in the urban centers that are within the 100-mile radius of the lake.



SULLIVAN
STATE HIGHWAY 121
FINDLAY
32
COUNTY ROUTE 3
COUNTY ROUTE 5
STATE HIGHWAY 128
STATE HIGHWAY
STATE HIGHWAY 16
ADMINISTRATION BUILDING
SHELBYVILLE



LAKE SHELBYVILLE, ILLINOIS
ENVIRONMENTAL IMPACT STATEMENT
ON
OPERATION AND MAINTENANCE

SCHEMATIC PLAN FOR A PLEASURE DRIVE

L E G E N D

EXISTING ROADS AND HIGHWAYS

POSSIBLE PLEASURE DRIVE

U.S. ARMY ENGINEER DISTRICT, SAINT LOUIS
CORPS OF ENGINEERS
SAINT LOUIS, MISSOURI

APRIL, 1974

2

PLATE V-5

PART VI

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

If operation of Lake Shelbyville for any one of the five project purposes were carried to the extreme in order to achieve short-term benefits, the maintenance and enhancement of long-term productivity in the project area would be endangered.

Extreme fluctuations in water level might protect downstream agricultural land from flooding, but would seriously impair the quality and productivity of the pool environment.

Extreme drawdowns which might be required by use of pool water for navigation and public water supply could destroy all elements of the aquatic community - requiring many years for recovery.

Intensive management for wildlife could destroy what is left of diminishing natural areas.

Intensive development for recreational use might bring short-term economic benefits, but use would quickly exceed the ability of the site to regenerate and retain productive, natural ecosystems.

Operation and maintenance procedures should guard against long-term damage to, or disruption of, ecosystems. Operation for flood control benefits and for recreation benefits pose the greatest threats to long-term productivity.

Operations which destroy shoreline vegetation and aggravate erosion may reduce short-term damage downstream, but cause long-term damage to the pool, including shortening its useful life. Because floodplains have evolved to withstand and recover from flooding, high water downstream probably causes less long-term damage than high water (above 610) in the pool. Compromises in flood control based on season, duration, and intensity cause the least long-term damage.

Since an expanse of open water has the capacity to attract visitors, developers, and others anxious to take advantage of its recreation-related potential, the possibility for over-exploitation is tremendous. Although important, recreational benefits are all of a short-term nature while the damage caused is often long-term. The activities of one group of people frequently diminish the value of the recreational experience for other groups. The number of people in an area and the types of activities pursued must be commensurate with maintenance of a rural and relatively natural appearing environment. If the quality of the environment begins to deteriorate from over-use, long-term benefits are jeopardized. If fee-owned lands were sold, the ability to regulate land use would be lost. Even the lease of extensive tracts of land would limit the effectiveness of environmental protection controls. The desire to improve project benefit-cost ratios, increase revenues, and meet immediate recreational demands of the public should be curtailed so that use of the land and water do not damage quality.

PART VII

ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

Commitment of land for development, and alternation or destruction of biological communities are effectively irretrievable commitments of resource because the actions are not readily reversed. Operation for recreation has resulted in commitment of about 1,038 acres of land for intensive recreational use. This commitment could be reversed but the potential productivity which could have been gained from the land during the period of commitment is irretrievable.

The irretrievable damage done to shoreline soils and vegetation is the result of operation for flood control purposes. Other damage to both aquatic and terrestrial communities will result from continued operation for flood control, but damage to downstream areas would result from abandonment of pool regulation for flood control. Since most downstream damage is to annual crops, little irretrievable commitment of the resource is involved. Damage to shoreline vegetation which is part of an established community, with individuals living 100 to 200 years, is far more of an irretrievable commitment.

The expenditure of energy for operation and maintenance is irreversible. These commitments are justifiable on the basis of the fact that they are necessary for maintenance of a quality environment.

PART VIII

COORDINATION WITH OTHER AGENCIES

Coordination with other Federal, State and local agencies concerning the operation and maintenance of Lake Shelbyville is a regular and a continuing process. The Federal and State of Illinois EPA are contacted regularly concerning pollution problems. Regular meetings are held with the Department of Conservation, State of Illinois, concerning wildlife and fish problems. Coordination on mutual interests and requests for help are made with a multitude of other agencies such as local sheriff's departments, local fire districts, county conservation agents, the Soil Conservation Service, and others.

Copies of this Draft EIS were furnished to Federal, State and local agencies authorized to develop and/or enforce environmental standards, together with other groups, organizations, and individuals who have expressed concern in environmental matters. These are listed on the Summary Sheet. Their views and comments are summarized on the following pages. Only those comments which pertain to the Environmental Statement are given a written response.

(1) U. S. Soil Conservation Service, Sullivan, Illinois.

No comments have been received.

(2) U. S. Department of the Interior, Office of Environmental Project Review, Washington, D. C.

Comment: Minerals - The only significant mineral resource in the project area is coal and the commitment of 5 million tons of strippable Shelbyville Coal was made when the reservoir was authorized in 1958. The continued operation of the reservoir and the further development of recreational facilities on presently owned fee land will have no further impact on mining or mineral resources. The statement adequately discusses these points and is acceptable.

Comment: Historical and Archeological - We recommend that the final statement present documentation of review by the State Historic Preservation Office of Illinois to insure that no property in the process of nomination to the National Register of Historic Places will be adversely affected by the proposal.

Response: The State Historical Preservation Officer of Illinois has been contacted and his answer is included in Part IX, Comments Received.

Comment: The final statement should also clarify whether or not areas proposed for future construction or alteration were included in the area surveyed by Mr. William W. Chmurny in 1960. In the event they were not included, the final document should specify arrangements for archaeological survey prior to construction.

Response: Past archaeological surveys were carried out in those areas that were to be affected by the construction of the dam and the filling of the lake. Some sites were located above the lake but no special effort was made to find them. The Illinois Archaeological Survey has been contacted on this subject and is preparing a proposal of what is involved archaeologically. The Lone Point and Coon Creek areas are presently under construction.

Comment: Procedures to be followed in the event unrecorded cultural resources are encountered in the construction and lateration phases should be included in the final environmental statement. Otherwise, we have found the statement generally responsive to the jurisdictions and interests of historical and archaeological matters.

Response: In the event unrecorded cultural resources are encountered during future construction phases, representatives of the Illinois Archaeological Survey will be notified, and materials located described. Arrangements will be to make available sites and artifacts for professional inspection; construction activities will be redirected until sites can be examined. If appropriate, mitigative plans for conserving significant resources will be developed in consultation with professional archaeologists.

Comment: Wildlife and Fishery Resources - The statement is generally adequate in respect to its treatment of fish and wildlife resources. In matters concerning lake level management, however, continued cooperation with the Illinois Department of Conservation is required to equate the needs of fishery resources with those of flood control and navigation. It is especially important to establish winter lake levels and drawdown procedures that will permit full development of the potential fishery of Lake Shelbyville.

Response: The St. Louis District works closely with the Illinois Department of Conservation, Division of Fisheries. Master Plan, Appendix D, Lake Shelbyville Fish and Wildlife Management Plan proposes a lake drawdown as a fish management tool when fish population surveys indicate that such lake manipulation would be beneficial.

Comment: Geologic Conditions - Potential environmental problems related to geologic conditions appear to have been adequately considered in the draft environmental statement. The statement appears unusually comprehensive in most respects and would be an excellent model for future statements for similar projects.

Response: Noted.

Comment: The proposed action summarized on Page vi (Item #2) should be the continued operation and maintenance of the project, as this action will have been carried on for 49 months as of August 1, 1974, (p. III-1).

Response: Agree; this change has been made on Page vi (Item #2).

Comment: The description of relocated facilities mentions power lines, telephone lines, pipelines, and a cemetery, but no mention is made of people, farms, or other businesses (p. I-11). A complete reading of both volumes failed to provide any information on displacement or their impact. It would be appropriate to include this information in the section of "Relocated Facilities" in the summary of environmental impacts (p. vi), and possibly in the historical discussion of "Environmental Changes Resulting from Settlement and Development" (p. II-39 to II-41). The latter discussion mentions the slow settlement of the Kaskaskia River Valley starting about 1650, and the fact that by the 1700's there were a few farms and sawmills along the river (p. II-39). However, no mention has been made here or elsewhere of the impact of lake construction on people when, in the space of a few years, all those who had settled on the 34,408 acre project area were presumably forced to leave, some of them probably including the descendants of the early settlers of the 1700's.

Response: The sections cited above on Relocation Facilities has no purpose in an EIS for operation and maintenance and they have been deleted. Operation and maintenance of Lake Shelbyville will displace no people, farms or businesses; this took place during construction. Thus, a statement on this subject in the summary of environmental impacts is incorrect since there is no impact.

Comment: The section on Alternatives (Part V) includes a discussion of two alternatives for shoreline treatment, one being to allow flood-killed trees to fall naturally and decompose except in areas of heavy use, and the other being to install protective riprap on heavily used banks but to take no action elsewhere. Both of these alternatives appear to be in present practice, and their continued use is evidently proposed. Since no real alternatives to these practices have been explored, it would be appropriate to include them in the description of the proposed project (Part I) rather than in the section on Alternatives.

Response: Agree. These alternatives have been removed from Part V and they have been included in the description of the proposed project, Part I, Page I-17, Para. 7.

Comment: It would be helpful to refer to the Appendices on geology and soils in appropriate sections of Volume I.

Response: Volume I is written with no references to Volume II. Volume I is the Environmental Statement written in a manner that the non-specialist can understand. Volume II is added to provide additional technical data which may interest the specialist.

Comment: The draft statement is reasonably adequate and accurate in the evaluation of the environmental impact of the proposed action on water resources of the area.

Comment: Summary - We find that the draft environmental statement contains a great deal of comprehensive information regarding environmental impacts related to geologic conditions and minerals. However, we also find that the statement lacks in its assessment of environmental impacts in other areas as we have mentioned. We wish to emphasize that the comments rendered be utilized in the environmental statement to support the impacts presented.

(3) U. S. Forest Service, Eastern Region, Milwaukee, Wisconsin.

Comment: The impact of Flood Control Storage and the anticipated rise of the lake level to 615 feet is described only in general terms. The acreage of trees that will be lost along the 172 miles of shoreline and the impacts of that loss should be estimated.

Response: Concur. Paragraph 1, Page III-15, has been changed to include estimated woodland loss and the impacts of their loss.

Comment: Under New and Continuing Construction (P. III-31) there is no mention of erosion control during construction, or amount of impact on woodland.

Response: The impact of recreation facilities on woodlands is discussed in the statement. The construction of these new facilities will, of course, have an adverse effect on these woodlands but with proper design and management these will be held to a minimum.

As for erosion control during construction, the following is standard procedure. All construction contracts require the contractor to submit in writing his proposals for implementing environmental pollution control. Specific attention is directed to erosion control measures, and restriction of construction activities to minimize the effects on woodland. Erosion control measures include restrictions on site selection for construction buildings, storage and parking facilities, and temporary excavation and embankments. These restrictions are designed to prohibit unnecessary destruction of natural ground cover. Construction activities are restricted to areas specifically designated on contract drawings. All cut and fill slopes are graded to reduce erosion to acceptable limits; if necessary, temporary sedimentation ponds are constructed. All temporary control measures (berms, dikes, drains) are maintained until permanent control facilities are completed and operative. The amount of bare soil exposure is held to a minimum by specifying the appropriate sequence of construction operations. Fills and waste areas are constructed to eliminate erodable materials on the surface. Temporary seeding may be required. The impact of construction on the woodland is controlled confinement of activities to specified areas. When working in specified areas cannot unnecessarily disturb trees and shrubs. Contractors cannot attache ropes and cables to trees without specific authorization. If authorization is given the trees must be wrapped with burlap and fitted with softwood rubbing cleats in areas where the ropes and cables are applied. Where trees may possibly be defaced or damaged the contractor must place boards, planks or poles around them. Where earthwork operations might cause earth or rocks to be displaced into uncleared areas, barriers are constructed to protect the trees. The contractor is responsible for restoration of all damaged landscape features to their original condition or as nearly as possible. Site clearing kept to the minimum necessary for construction of the facility.

Comment: Under Project Purposes, Fish and Wildlife concerns are included, but not woodland, which has a positive value for water regulation and recreation in addition to its role as wildlife cover.

Response: Forest management was not authorized by Congress as a project purpose for Lake Shelbyville while fish and wildlife conservation was. However, the importance of managing not only woodlands but all lands is recognized as an essential part of any wildlife management and erosion control program. A Forest Management Plan has been prepared for Lake Shelbyville and is included as an Appendix to the Master Plan. Forest Management is discussed on Page I-26.

(4) U. S. Soil Conservation Service, State Conservationist, Champaign, Illinois.

Comment: Shoreline or Bank Erosion - Erosion especially shoreline or bank erosion is a serious and increasing problem in the project as indicated on pages I-20, Plate II-20, II-16, II-70, III-16, III-19, III-31, IV-1, IV-3, and V-35. Under Preservation of the Project Area's Natural Character we read "To date, the only successful way to control bank erosion has proven to be the lining the shore with riprap." Under impact of Resource Management we note (III-19) "No management techniques for control

of widespread erosion have been implemented." A specific resource management program to deal with soil and water conservation problems on the shoreline, in the heavy use recreation areas, along road cuts and other disturbed areas will be an essential part of maintaining a quality environment for the area. If you have not already done so, you may wish to review the recommendations found in the Soil Conservation Service technical guide relating to the establishment of vegetation on critical areas. Consideration could be given to placing a soil conservationist or agronomist on the Lake Shelbyville Resource Management staff to help with land use, erosion and sediment control work. One potential would be to establish some vegetative field trials for erosion control on the 170 miles of shoreline and other critical areas.

Response: As stated shoreline or bank erosion is a serious and increasing problem at Lake Shelbyville. The statement "No management techniques for control of widespread erosion have been implemented" is incorrect and has been dropped from Page III-17 while Page I-18 has been changed to describe the techniques used.

Other types of erosion, as stated on Page III-17, are minor and are dealt with quickly. As present construction is completed, the remaining major source of non-shoreline erosion will end. As a part of our general land management program, erosion control is a priority item. Thousands of dollars have been spent on maintaining good grass cover in recreation areas and in stopping erosion problems wherever they are on lake lands. The District Conservationist, Sullivan, Illinois, Mr. George Gray, has been contacted on a number of ocassions and is presently preparing soil maps of certain sections of lake lands.

While no soil conservationist or agronomist is presently on or planned for the Lake Shelbyville staff, individuals with degrees in agriculture, conservation and forestry are there. With the help received from the local SCS agent the Lake Shelbyville staff is capable of taking care of non-shoreline erosion problems.

Vegetative field trials for erosion control on shoreline erosion would have little value. Experience at Lake Shelbyville and other lakes has shown that this type of erosion can remove fully grown trees and 500 lb. riprap. Until a natural beach is formed, only artificial means can stop this type of erosion.

Comment: Land Treatment in the Watershed - Page II-46 - Consideration should be given to providing financial and technical assistance for an accelerated soil and water conservation program in the Lake Shelbyville watershed. The Soil Conservation Service can provide a Conservation Needs Inventory showing the soil and water conservation work needed in the watershed. The soil and water conservation districts in the watershed could be contacted concerning their cooperation in the accelerated land treatment program. The Soil Conservation Service estimates a need for additional conservation treatment on 340,000 acres of cropland, 35,000 acres of pastureland, 31,000 acres of woodland, and 7,000 acres of other land above the reservoir.

Response: The Corps of Engineers has no authority or monies for such work off of Federal lands. The Corps of Engineers would, of course, cooperate, within the limits of its authority and funding, with the Soil Conservation Service and local water conservation districts on such programs.

Comment: Under the Local Setting (II-3) first sentence of second paragraph in discussing glacial geology reads "because it is so young there is little erosion." Suggest it read "because it is so young there is little geological erosion." There is soil erosion in the Upper Kaskaskia drainage basin.

Response: Concur. Page II-2, Para. 6, has been changed as suggested.

Comment: Water Quality (I-28) and (I-29). Is the volume of sediment coming into Lake Shelbyville being recognized and monitored as a detriment to the environment? We note turbidity and chemicals attached to soil particles are being monitored but see no reference to volume of sediment or rate of sedimentation.

Page II-19, Table II-1, gives the geologic timetable for sediments in the study area. Approximate rate of sedimentation under existing watershed management conditions would be valuable in current project Operation and Management.

Response: Shelbyville Dam will trap 97% of the sediment entering the lake. An estimated 217 acre-feet of sediment will accumulate annually. With 30,000 acre-feet of storage provided in the lake for this purpose, see Plate II-8, it will take over 100 years before sedimentation effects will impede any project purposes. A sediment range network has been established, and is surveyed on a scheduled basis to determine the locations, rate of deposition, and the effects of future sedimentation. This statement has been added to Page II-28, Para. 7.

Comment: Land Use Planning (II-65) "Since 1970, 18 separate subdivisions have been platted adjacent to federal lands on the lake." Some of the soils in the proposed subdivisions or those yet to be planned could have severe limitations for on-site septic systems. The Soil Conservation Service has interpretive soils information which it is pleased to make available to county planning commissions, health departments, zoning boards and others showing the suitability or limitations of specific soil types for agricultural use, septic tank filter fields, recreation use, highway subgrade materials and other land uses.

Response: Concur.

Comment: Impact Downstream, Page III-14 - In working with landowners downstream our technicians have heard complaints that a continuous flow at a high rate of release seems to cause flooding of slough areas and makes it impractical to plan good agricultural drainage for lack of proper outlets when needed to plant, grow and harvest a crop. There is the potential if this situation continues, it can cause landowners to farm their upland

soils beyond their capability to the long term damage of both the land and the community.

Response: Comment noted.

Comment: Interpretive Center (V-35) - If an interpretive center is established, consideration could be given to explaining the unique geology of the area namely the Shelbyville moraine and its influence on the soils and native vegetation of the area. The Soil Conservation Service would be glad to cooperate in locating profiles of the typical soils along road cuts or in pits.

Response: As the lake's interpretive program progresses, the above mentioned items will be dealt with.

Comment: Page I-29, first paragraph - Suggest line 2 include grasses in addition to trees and shrubs.

Response: Developed recreation areas are managed with a turf management program which includes soil testing, liming, fertilization, seeding of grass, etc. Grass cover is not a limiting factor in recreation areas, therefore, is not included in Practice 1.

Comment: Pages II-16 and II-17 - Properties of Soils - Drummer Silty Clay Loam should be included in the list due to the large acreages included in the water shed.

Response: Concur, Page II-16, Para. 2, has been changed as suggested.

Comment: Page II-39 - Suggest the word "exploited" in last paragraph be changed to "Used" for cultivation until about 1830 when the steel plow became available.

Response: Concur, Page II-36, Para. 4, has been changed.

Comment: Page II-39 - General Impact of Habitat Modifications, line 8 Suggest the word "extensive" be substituted for "excessive."

Response: Concur, Page II-36, Para. 1, has been changed.

Comment: Page II-40 - Suggest deleting the last sentence of third paragraph "Agricultural pollution and flooding have been aggravated by the rapid runoff resulting from tile drainage." This may be more of an opinion than fact.

Response: We feel the statement is correct.

Comment: Page II-73 of Volume I, Planning and Zoning - Last sentence on the page indicates that both Shelby and Moultrie Counties have county planners. It is our understanding that Shelby County has a Zoning Administrator but no county planner. You may wish to check this out.

Response: Concur, Page II-66, Para. 8, has been changed.

Comment: Plate II-14 - Is the legend on this map of Habitat Types - 1974 consistent with the text discussion? Is the "agriculture" legend meant to be "cropland" as discussed on page II-46?

Response: Agriculture as used in the Legend for Plate II-14 denotes all lands used for agricultural purposes including cultivated lands and pastures.

Comment: Technical Appendix, Page C-1 Soils. Shouldn't the plate referred to be Plate II-1 rather than Plate II-4 in the paragraph discussing glacial drift and moraine?

Response: Yes, Page C-1 has been corrected.

Comment: The loss of prime agricultural land is of concern. It would strengthen the statement if it included the estimated acreage of prime agricultural land that is expected to be taken by additional development over and beyond the project lands.

Response: Page II-59 Future Land Use does address this concern. While no acreage figure is given, it is felt the determination of one would serve no useful purpose. The amount and type of private development is highly conjectural as inferred in this section on Future Land Use.

Comment: If you have questions concerning the soils, erosion and sediment control, vegetative seedings, woodland or wildlife plantings, tree and shrub plantings for noise barriors, agricultural water management or any other soil and water conservation work, please do not hesitate to get in touch with our Soil Conservation representative in the county involved.

(5) OEO, Chicago Regional, Chicago, Illinois.

Comment: Our review indicates no need for OEO comment on this draft document.

(6) Regional Federal Highway Administration, Homewood, Illinois.

No comments have been received.

(7) Office of Economic Opportunity, Washington, D. C.

No comments have been received.

(8) U. S. Department of Transportation, U. S. Coast Guard, Washington, D. C.

Comment: The statement appears to recognize most of the environmental consequences of the proposed action. However, we do feel that something more is needed than mere recognition of probable adverse effects of increased traffic on area-wide highway systems. Discussion such as that

on pages II-68, 73 and 75, points out the inadequacy of many local roads for carrying increased traffic volume and loadings, yet fails to discuss any intent to assist or cooperate with highway officials in solving the problem of generated traffic on those roads. It is suggested that before plans are committed for added development of lake access areas and campgrounds, the Corps of Engineers should cooperate in assuring that adequate rights-of-way are reserved for future highway needs.

Response: Coordination with local highway officials has been accomplished. Specific coordination with an individual Highway Department was not done but meetings were held with both Moultrie and Shelby Counties Board of Supervisors and Planning Commissions, on which the local Highway Departments are represented. These agencies are identified in Part VIII, Coordination With Other Agencies. Based on the mention of the Board of Supervisors and Planning Commission in Part VIII it is our opinion that it is not necessary to enlarge upon the coordination that has been accomplished. These meetings took place as early as March 1964. Early Corps involvement in this area resulted in the upgrading of access roadways in two areas, and more recently we have completed a Design Memorandum which is requesting improvement of access roadways to five areas. These were done in cooperation with the local counties.

Comment: Regarding the concept of the environmental statement, it is our feeling that the Corps of Engineers should assume the position of lead agency as set forth in the CEQ guidelines. If this were done, the necessary adjustments of highway systems could be considered in proper perspective, and it would not be necessary for highway agencies to make their assessments of environmental impact on a piecemeal basis and on questionable section lengths in the area of impact of Lake Shelbyville.

Response: The use of a "Lead Agency" for the preparation of this statement is questionable based on CEQ guidelines. The guidelines describe a situation in which more than one agency sponsors an action or is involved through funding, then a "Lead Agency" should be designated for the preparation of the statement. The formal assumption by the St. Louis District or the "Lead Agency" is not recommended. The local agencies were made aware of the impending traffic as a result of the lake, this was done at coordination meetings prior to the start of construction of the lake.

Comment: At a minimum the statement should include information on the projected usage of the various recreational facilities to be provided at Lake Shelbyville, including vehicle occupancy rates and/or vehicle trips for each of the lake access sites and campgrounds. This information will be vital to any systematic planning of highway needs in the proximity of the lake.

Response: Regarding the comment about including information on the projected usage of the recreation facilities. This information is furnished to the local governments in the form of total annual visitation, also the local agencies are informed of the planned developments around the lake both initial and future development. The above information is provided to the agencies at the coordination meetings and it is stated in the Master

Plan for the project. We recognize that the information is not in the format as presented in the above comment, but it is presented in a manner which will give the local agencies some basis for future planning.

Comment: The Department of Transportation has no other comments to offer nor do we have any objection to this project. The final statement, however, should address the concerns of the Federal Highway Administration.

(9) U. S. Department of Commerce, Washington, D. C.

No comments have been received.

(10) U. S. Environmental Protection Agency, Regional Administration, Chicago, Illinois.

Comment: From our field review of the project area, it is evident that the current major problems at Lake Shelbyville are erosion and high water levels. These problems discourage and restrict many recreational opportunities such as swimming and boating. Erosion along the lake shoreline due to high water, wave action, boat wakes; and erosion along park roadways, service roads and especially around the access wastewater disposal plants require immediate attention in order to curtail sediment transport into the lake. It appears that stricter enforcement of all contract work is required to effectively control erosion during and after construction.

Response: The statement recognizes the problems of high water levels and shoreline erosion and assess their impact. The erosion caused by construction along lake roadways, service roads and around the access wastewater disposal plants noted during the field review of the project has been stabilized and dressed. The importance of strict enforcement of erosion control on all contract work has been re-emphasized to all our field office personnel.

Comment: Lake Shelbyville lies within the Kaskaskia River Sub-Basin which is part of the Upper Mississippi River Basin. This area was included as part of the Upper Mississippi River Comprehensive Basin Study (UMRCBS) and there are no apparent conflicts between recommendations made as a result of the UMRCBS and current O&M practices at Lake Shelbyville. At this time there is no 303(e) water quality management plan which includes the project area. It is assumed that the forthcoming 303(e) plan will include all O&M activities at Lake Shelbyville.

Response: Concur. The completed 303(e) plan will include all O&M activities.

Comment: Past water quality data for the Lake Shelbyville area should be included in the EIS. A water quality monitoring program for Lake Shelbyville should be developed with appropriate State and local officials to detect potential water quality changes in the lake and assure future compliance with applicable water quality standards. According to Dr. Allison Brigham of the Illinois Natural History Survey, overall water

quality in the lake has been improving steadily over the past two years. Dr. Brigham has reported that while phosphorus levels in some areas exceed water quality standards, she believes that this condition is temporary and should not exist when water levels are at normal recreation pool elevations. It is our opinion that the major concern related to water quality in the project area is that of nutrient input as a result of fluctuating water levels, agricultural runoff and erosion. Water quality problems of low dissolved oxygen, algal blooms and hydrogen sulfide production are a direct result of these autochthonous inputs.

Response: As stated in the impact statement, the Illinois Natural History Survey has conducted a water quality investigation program through a Government Contract since March 1970. This monitoring program is designed to detect any water quality changes in the lake. The past water quality data obtained from this monitoring program is too volumous to be placed in an EIS. If copies of past annual reports are desired, they can be obtained from the water quality section of the U. S. Army Corps of Engineers, St. Louis District, St. Louis, Missouri.

It is agreed that the major concern in Lake Shelbyville is nutrient input from agricultural runoff and industrial processes. Fluctuating or high water levels though, have little or no affect on water quality by themself. Nutrient levels are usually highest during times of high water levels because rains and therefore, agricultural runoff is highest during these periods. As Dr. Brigham states, overall water quality in the lake has been improving steadily over the past two years.

Comment: With regard to local municipal sewage treatment plants (STP) discharging directly or indirectly to Lake Shelbyville, treated effluent from the Sullivan STP (primary treatment) and Findlay STP (secondary treatment) exceed allowable secondary treatment requirements for BOD. However, the Kaskaskia River Basin is at this time very low on the State priority list for wastewater treatment construction grants, and improvement of STP's in the basin in the near future is unlikely. Irregardless, an implementation schedule with the necessary commitments providing for adequate treatment of all point source discharges upstream of the dam should be adopted as soon as practicable.

Response: Concur; it should be noted that the Corps of Engineers has no authority over municipal sewage treatment plants located off of project lands.

Comment: The Army Corps of Engineers District, St. Louis have been authorized by the U. S. EPA to discharge from wastewater disposal plants at Lone Point, Whitley Creek, Wilborn Creek, Lithia Springs, Coon Creek, Opossum Creek and Dam East Access Areas to Lake Shelbyville in accordance with NPDES permit conditions effective August 28, 1973. According to July 25, 1974 letter and attachments from Mr. James A. Petersen, Acting Chief, Operations Division, many of the access area wastewater disposal plants are under construction and are being modified to insure more effective treatment. While we realize that the contractor has not turned over many of the wastewater disposal plants to the Corps for maintenance

and operation, these plants are nonetheless operating in a construction phase and are discharging to Lake Shelbyville. Such discharges require immediate monitoring procedures in accordance with NPDES permit conditions to insure adequate treatment for the protection of public health. We note that phosphate levels from Whitley Creek, Wilborn and Dam East Access Areas wastewater disposal plants exceed allowable permit conditions and should be brought into compliance as soon as possible. Please inform us when the phosphate removal equipment has been installed.

Response: As requested by the U. S. Environmental Protection Agency, all discharges from wastewater disposal plants still under the control of contractors is being monitored by Corps of Engineer personnel to insure adequate treatment for the protection of public health. The U. S. Environmental Protection Agency will be notified when the phosphate removal equipment has been installed on the plants which presently lock it.

Comment: The contagious fish blood disease and resulting fish kill reported in 1972 was studied by Dr. Warren Brigham of the Illinois Natural History Survey. Dr. Brigham feels that this dramatic occurence was a unique example of population control. The initial filling of Lake Shelbyville resulted in an enormous bass population explosion. Later during winter drawdown the fish were confined in a very limited area and stress conditions resulted. Dr. Brigham believes that it is unlikely that such conditions will reoccur at Lake Shelbyville.

Response: Concur; this contagious fish blood disease should not reoccur.

Comment: The general cleanliness of access area grounds and restroom facilities at Lake Shelbyville was observed during our field inspection to be excellent; we believe maintenance crews should be commended. Fish baskets like that installed at the Coon Creek Access Area collect fish wastes generated at "Fish Cleaning Areas" and prevent clogging of wastewater disposal facilities. Such practices are certainly public health oriented and their continued practice and development should be encouraged.

Response: Comment noted.

Comment: While we recognize the impracicability of prohibiting swimming along all shore areas when beach areas are inundated by high water levels, we request that enforcement of some type be taken to prevent swimming in access area waters directly receiving treated sanitary effluent. Swimming in coves, shore areas or streams receiving treated effluent is a potential health hazard and requires immediate remedial measures.

Response: No swimming buoys will be placed in coves where treated sanitary effluent is discharged. Park rangers will enforce the no swimming regulation under Title 36.

Comment: Our latest inquiry to Illinois EPA revealed that Shelbyville's first permit application submission for certification of the City Dump as an approved landfill was denied. While Shelbyville does have an old State

of Illinois Public Health permit, this is no longer recognized as valid by Illinois EPA since it expired July 27, 1974. Shelbyville resubmitted the revised permit application on July 25, 1974; Illinois EPA is currently reviewing it. If a valid permit is not issued prior to the release of the Final EIS, provision should be made to dispose solid wastes at another site holding a valid permit issued by the Illinois EPA. Approved sites exist in Sullivan, Mattoon, Taylorville, Decatur and other local communities. Future contracts for refuse collection and disposal should require that wastes be taken only to a site holding a val Illinois EPA permit. Also, we recommend that such contracts contain a termination condition if the contractor disposes of wastes at a site not holding a valid permit.

Response: A new cleaning services contract is to be advertised during the winter of 1974 and 1975. The section dealing with Disposal of Refuse in the new contract will be changed to read "Refuse must be disposed of at a landfill holding a current, valid Illinois EPA permit."

Comment: During our field trip, we found that pump and motor noise from the Lithia Springs Access Area wastewater disposal plant was sufficiently high to cause disturbance to sleeping campers of nearby campsite areas. If it is not possible or practicable to reduce the noise at the site, closure or relocation of certain camp sites to a less noisy area may be appropriate. Until the problem is resolved, campers should be made aware of the disposal plant's intermittent noise impacts before being assigned a camp site in the impact area. We encourage an examination of the other access area wastewater disposal plants and their compatibility with the immediate land use.

Response: Sound level readings were taken at the camp site closest to the sewage treatment plant at Lithia Springs and were found to average 56 decibles when the plant was running which was 10 decibles above normal background noise. This level of sound certainly presents no hazard to the campers using the area. It is doubtful whether the noise level by itself causes any disturbance to sleeping campers. The disturbance rather, is caused by the type of sound, mechanical in a natural setting. You may be assured that this problem was considered when locating these plants. It must also be remembered that the accomplishment of any task is a compromise between conflicting needs. An attempt will be made to reduce the noise level at the sewage treatment plants by insulating the inside of the motor and compressor cabinets.

(11) Advisory Council on Historic Preservation, Washington, D. C.

Comment: To insure a comprehensive review of historical, cultural, archaeological, and architectural resources, the Advisory Council suggests that future draft environmental statements prepared by your district contain evidence of contact with the appropriate State Historic Preservation Officer as well as a copy of his comments concerning the effects of the undertaking upon these resources. The State Historic Preservation Officer for Illinois is Mr. Anthony T. Dean, Director, Department of Conservation, 102 State Office Building, 400 South Spring Street, Springfield, Illinois, 62706.

Response: The Draft EIS was sent to Mr. Anthony T. Dean and his comments as State Historic Preservation Officer for Illinois are presented in Part IX, Comments Received.

(12) U. S. Soil Conservation Service, Shelbyville, Illinois.

No comments have been received.

(13) Illinois Department of Conservation, Havana, Illinois.

No comments have been received.

(14) Mr. Bill Fritz, Illinois Department of Conservation, Carlyle, Illinois.

No comments have been received.

(15) Illinois Department of Conservation, Findlay, Illinois.

No comments have been received.

(16) Illinois Department of Natural History, Survey Laboratory, Sullivan, Illinois.

No comments have been received.

(17) Illinois Department of Conservation, Springfield, Illinois.

Comment: When considering what impact the operation and maintenance of Lake Shelbyville will have on the general ecology of the area one point is outstanding; this is the constant abnormal pool fluctuations that have been common since full pool was first reached. These continued fluctuations have caused substantial loss in vegetation, and fish and wildlife habitat. A continuation of this instability will result in a general decrease in vegetative, fish, and wildlife diversity.

Response: 1973 and 1974 were years of abnormally high rainfall in the Lake Shelbyville Basin. Because flood control is one of the project purposes of the lake, periodically high water levels will be held in the lake. The objective is to prevent flooding downstream of the dam for small volume floods by temporarily storing the water on fee land in the flood control pool and releasing it later at a lower, non-damaging rate. Whenever an artificial lake is created, the environment around it is changed. Upland type tree and shrub species along the shoreline are now exposed to a wetland environment and will die. These species should be replaced through natural succession by more water tolerant trees such as willow and silver maple.

Comment: One general observation worth noting is that due to the timing of the report, recent record water levels and subsequent hydrological data were not incorporated. In many places, old predictions of pool levels are misleading and perhaps new tables need to be developed that would aid in enhancing the five project purposes.

Response: Agree; unfortunately there must always be some cutoff point when recently acquired data cannot be included in a report and still meet schedules. The water control plan for this lake is presently being revised but it would be inappropriate to include the statistics of this plan until they are complete.

Comment: Page I-19, Para. 2 - Recreation would not be adversely affected if normal pool level was not obtained by May 1. Boating, water skiing, sailing, and swimming are negligible at this time. Fishermen would rather see the water lower. Greater flood storage would thus be available. A gradual rise in pool level to reach a maximum by June 1 would also be very beneficial from the standpoint of fisheries management.

Response: Concur; Page I-16, last paragraph, has been changed to indicate a June 1 date.

Comment: Page I-29, Para. 2 - This practice would apparently not be needed below the elevation given as water levels above 610 m.s.l. have been regular enough to control non-tolerant species.

Response: It should be remembered that we have been going through a wet cycle, thus the high pools but during more normal periods and during periods of drought, this practice may very well be needed.

Comment: Page I-27, Para. 2 - Substitute "fisheries - waterfowl marsh", for fish nursery pond.

Para. 5, Line 7 - Place "jointly" after operated and add "the Illinois Department of Conservation" at the end of the sentence.

Response: Page I-24, Para. 4 and 7 have been changed as noted.

Comment: Page I-28, Para. 2, Line 1 - Substitute "reproductive surveys" for creel census, as a creel census is not conducted annually. Add "angler creel census surveys and other biological investigations are conducted when deemed necessary."

Response: Page I-25, Para. 1, has been changed as noted.

Comment: Page I-34 Table - Values given to fish and wildlife benefits are definitely under-estimated (See 1972 National Survey of Hunting and Fishing) Angling alone had a projected expenditure value of nearly one-half million dollars in 1972.

Response: This may, in fact, be true but the Corps of Engineers cannot claim as benefits to the lake any tertiary benefits as "expenditure value." The Corps can only claim annual direct net fish and wildlife benefits to the project as determined by the Fish and Wildlife Service.

Comment: Page II-47, last paragraph - Add that in 1964 Stinauer also used - "the rotenone-potassium sampling method."

Response: Page II-43, Para. 4, has been changed as noted.

Comment: Page II-49, Para. 1 - Northern pike cannot be compared to trout as to temperature of water.

The terms "coarse" or "rough" fish should be replaced by the terms "commercial" or "non-game."

Response: Concur. Northern pike has been deleted from Page II-44, Para. 3. "Coarse" and "rough" fish terms have been modified in the text.

Comment: Page II-53, Para. 1 - Incorrect. Crappies are well established.

Response: Agree; Page II-47, Para. 4, has been changed as noted.

Comment: Page II-64 - The S.C.S. table of recreational facilities should be brought up to date.

Response: This table has been updated with revised 1974 figures.

Comment: Page III-18, Para. 5 - A rise in pool does not result in a suffocation of eggs. This is usually due to the deposition of silt or debris. "Frequent" should precede the word abandonment as not all species will leave the nests when there is a rise in pool level.

Response: Concur. Page III-16, Para. 5, has been changed as requested.

Comment: Page III-20, Para. 3 - Some introduced species such as walleye have become moderately successful contrary to this statement.

Response: In most cases introduced species will probably be unsuccessful.

Comment: Page III-31, Para. 5 and 6 - Installation of campgrounds in wooded areas damages ground cover and established trees. This degradation will continue as long as the campground is in operation, and would therefore, not only cause wildlife displacement, but depletion of habitat. Long term use of woodlands for campsites would have the effect of eliminating nesting and den trees.

Response: Concur, Para. 4, Page 28, states this.

Comment: Page V-18, Para. 1 - Add to the Carlyle catch the fact that 65% of the catch was buffalo fishes.

Response: Page V-14, Para. 2, has been changed as requested.

Comment: Page V-18, Para. 2 and 4 - Many assumptions are made here that are either misleading or invalid.

1) Being a relatively deep fertile lake, it is very doubtful if Lake Shelbyville will be that productive for commercial fishing.

2) It is very doubtful due to limited season and supply, in-availability of technical expertise, and lack of demand that commercial fishing could support the building and operation of a fish meal processing plant.

3) It is doubtful that commercial fishing would create new local jobs as it is a technical skill not found in the area.

4) This is not an attractive alternative and should not be considered.

Response: Statement two is probably correct and Para. 3 on Page V-14 recognizes this fact. While commercial fishing would create few if any new year round jobs, it could provide part time employment to many. The question to be answered is not how productive of an operation commercial fishing will be but whether it will adversely effect sport fishing. Para. 4, Page V-14 states that sport fishing should not suffer and the above comment does not dispute this statement. Commercial fishing is an attractive alternative, whether it is a viable alternative will only be determined by trying.

Comment: Page V-19, Para. 1 - Drawdowns, although unnecessary now, may be of future value and should not be put aside. The relationship made between water nutrients and soil nutrients is not true.

Response: The cited text description was incorrect and has been deleted. A discussion on drawdowns is included under Fisheries Management, Page I-24.

Comment: Page V-26, Alternative No. 4 - In view of the evidence presented in Plate III-3, this alternative would appeal to a vast majority of present lake users. The report states quite erroneously that limited appeal makes this alternative unfeasible.

Response: It is doubtful that many of the present users of the 3 private marinas, State or Corps campgrounds, large power boaters and many fishermen plus the users of Corps swimming beaches, would feel this alternative is acceptable. As stated in Para. 2, Page V-23, under Impact, man-made swimming beaches, large boat launching ramp facilities, marinas, campgrounds with electricity and shower buildings, would not be considered under this alternative. The word primitive in this alternative means primitive.

Comment: Page VI-1, Para. 4 - This implies that no cognizance is made of "natural" areas. Due to the past land-use practices, few, if any, natural areas exist. Management for wildlife, however intense, would consider the intrinsic value of "natural areas" and undoubtedly assure their perpetuation.

Response: It is true that few, if any, truly natural areas exist but that is true for the whole of the State of Illinois. What is left of those areas with a more natural character thus are an endangered comodity. Management for wildlife, especially intensive management, would probably not consider the intrinsic values of natural areas. Management for wildlife has traditionally aimed at maximum game benefits. Succession control, agriculture plantings, and artificial waterfall impoundments, no more assure the perpetuation of "natural areas" than does a forester's clear cutting and pine plantations. This paragraph is not meant to imply that no cognizance is made of natural areas in wildlife management but it is meant to imply that there is a basic conflict between the idea of natural areas and managed areas.

Comment: Comments Regarding Volume 2 - F-19, Table F-6 - This table should be listed in order of families as recommended by the American Fisheries Society Publication #6, page 4.

Northern redhorse now called shorthead redhorse.
Highfin carpsucker should be added to the list.
Common shiner is now called northern striped shiner.
The scientific name of the warmouth is now Lepomis gulosus.

Response: Concur. Table F-6 has been corrected.

Comment: F-22, Para. 2 - Stinauer found 40 species in the Kaskaskia River, other species by the Illinois Natural History Survey (see F-36). The species list for Lake Shelbyville plus the I.N.H. survey collection totals 69 species. which indicated very little change in the stream population.

Response: Concur. Page F-23, Para. 2, has been modified.

Comment: F-22, 3rd line - Stinauer used two sampling methods, not one.

Response: This statement has been dropped from the text.

Comment: F-23, Para. 2, Line 6 - Incorrect. A substantial thermocline does develop.

Response: Concur, Page F-24, Para. 2, has been modified.

Comment: F-24, Para. 4, Line 2 - Recommend using "frequently" instead of "always" which would be incorrect.

Response: Concur. Page F-25, Para. 4, has been changed.

Comment: F-26, Table F-8 - The reader is left to wonder what made up the other percentages of fishes caught. The addition of the carp, drum, and bowfin caught would make the table more complete. The second year of creel data from Carlyle is more comparable than the first year, since very little water was in the lake.

Response: The table was meant to compare general catches of sport species and not non-game species, thus, carp, drum, and bowfin were omitted. The Carlyle data was taken from the State's 1968 Creel Census. In 1968 Carlyle was not at full pool (445 m.s.l.) during the whole year, however, on 10 June the lake reached 446.6 m.s.l.

Comment: F-27, Table F-10 - Disagree with ratings.

Silvery minnow should be a ?
Suckermouth minnow should be a ? instead of a +
Bluntnose minnow should be a + instead of an 0
Creek chub should be a ? instead of a +

Response: Concur. Table F-10 has been modified.

Comment: F-30 - Could add 1974 stockings.

12,660 1-3 inch northern pike
50,000 1-1.5 inch smallmouth bass

Response: Page F-31 has been modified as requested.

Comment: F-30 - 1,020,000 instead of 020,000 walleye fry stocked on May 6.

Response: Concur, Page F-31 has been corrected.

Comment: H-10 - Use figures are widely different between Corps figures and the Illinois Department of Conservation. For example, boat fishing counts (Corps) was 11,100 for Memorial Day, 1973. In 1972, only 54,184 boat fishermen were projected for April 17, to October 31, 1972. Fishing was much better in 1972 that early 1973.

Response: The figures shown on Page H-10 are from actual surveys regularly taken at all Corps lakes. While these figures cannot be guaranteed, they are considered reasonable. It is noted that Illinois Department of Conservation's projection differs from these figures.

Comment: 1) Nutrient levels contrary to the draft are not high enough to contribute a serious or even moderate state of eutrophication.

Response: The statement does not state that nutrient levels are high enough to contribute a serious or even moderate state of eutrophication. The first paragraph on Page II-28 has been modified to clarify this point.

Comment: 2) The entire area needs to be marked to help reduce problems of management, trespass and encroachment.

Response: Concur, the Corps has obtained signs to mark the boundaries under their management. It is hoped that the State Conservation Department will do the same on areas they manage.

Comment: 3) Cost analysis throughout the report fail to consider various recent variables to which include:

a) Recent repairs to the dam

b) Developments by the State of Illinois and private businesses that have been damaged and delayed due to fluctuating water levels.

c) Timber losses caused by high water.

d) Increased erosion and siltation due to high waters which leads to a reduced life span and a decrease in the cost benefit ratio.

e) Agricultural damage below the dam due to flooding has increased in the last four years. This has some negative value.

Response: The repairs to the dam were included in the overall project costs and the project benefit-cost ratio. The project costs and benefits referred to in the Draft EIS reflect the cost-benefit structure over the entire project life. The Corps does not claim that they are exact for any specific point in time.

In the operation and maintenance phase of the project, pool regulation is the primary consideration. A reservoir regulation strategy was developed to maximize the project purposes of flood control, recreation, water supply, fish and wildlife, and navigation while minimizing any deleterious effects upstream, downstream or within the pool. The applicable economic variables were integrated with the pertinent hydrologic data to simulate various regulation plans. Given the constraints of hydrologic feasibility, the optimum economic plan was selected.

The project, as authorized by the 85th Congress, is essentially incomplete. In addition to the dam and reservoir at Shelbyville, the authorization called for six levee projects between Cowden and Vandalia. At this time none of the levee projects have been constructed.

Comment: 4) A reforestation program should be undertaken to reclaim some lands where timber losses have occurred.

Response: The value of reforestating areas within the flood pool is questionable. These areas will naturally regenerate to water tolerant species where that is possible. Artificial regeneration on the other hand, will be expensive and demanding of a tremendous amount of manpower if seedlings are used.

Plans are presently being made to reforest flood killed areas located within heavy use areas. Those areas outside heavy use areas and above 610 m.s.l. may be aerial seeded if enough seed can be obtained.

Comment: More attention should be given to maintaining the high productivity levels at the upstream end of the lake via stabilization. This area provides a much needed transition zone between stream and lake ecosystems.

Response: Because flood control is an authorized project purpose, a stable or near stable pool is impossible. The maintenance of a stable pool for recreation and the ecology of the pool is recognized and an effort is made to minimize pool fluctuations. During wet years though, this is impossible because of flood control operations.

Comment: The main objection that can be offered is one of management. The anticipated products of a multipurpose reservoir are not being realized at Lake Shelbyville. In attempting to comply with the demands of the five various functions, none is properly treated, and each is degraded. What is needed is a re-evaluation of priorities that would lead to a more concise management program. Each specific purpose must be looked at in relation to all others and not in its own perspective. It is recognized that none of the problems are due to prolonged high water levels in the spring.

Response: This comment is the writer's opinion. A careful reading of the statement shows that each project purpose has been looked at in relation to all others. The statement has presented the basic conflicts between the project authorized purposes and the compromises necessary to manage a multipurpose lake. While each specific purpose, if looked at singly, may not be properly treated and even degraded; all project purposes, when looked at as relating together, have been treated properly. The statement that none of the problems are due to prolonged high spring water levels is false. High pool levels cause the greatest conflicts in a multipurpose project.

Comment: In the opinion of the Illinois Department of Conservation, storage for navigation is having an undesirable effect on the other four project purposes. All would stand to benefit if this purpose were downgraded. (Page V-14 alternative 2) The benefit assigned to navigation (Page I-35) is listed as $36,000; far below any of the benefits for the four other purposes. This alone would justify the thesis that a disproportionate amount of total storage is allocated to navigation.

Response: As of this date, as stated in the EIS, Lake Shelbyville has not been operated for the purpose of navigation. Thus, storage for navigation has had no effect on the other four lake purposes.

Comment: A most useful and enjoyable lake environment could be obtained if a combination of various alternatives were initiated:

1) As mentioned before alternative #2, page V-14 is of benefit to all other project purposes.

2) Alternative #4, page V-10 could prove effective if pool releases were done on a gradual basis. Some sort of release chart could be conceived that would serve to enhance all project purposes except navigation. This release could include a five year drawdown plan beneficial to fish management.

3) Alternative #2, page V-18 is a very important aspect that would have no effect on other purposes. It should be implemented.

4) As far as present use of the lake is concerned, alternative #4, page V-25, should be implemented. 70% of the use of Lake

Shelbyville comes from within a 50 mile radius, and the wishes of these users need to be realized. This alternative need not totally eliminate other recreational activities, but should place restrictions upon them.

Response: As stated in the conclusion to the alternative to subordinate Navigation to Other Project Objectives, Page V-13, this alternative is attractive since it will benefit the other four project purposes but could be disastrous to navigation on the lower Kaskaskia during drought years.

Flexible pool releases are an attractive alternative since they could benefit all project purposes. Whether navigation should be downgraded would only complicate this alternative since that alternative has already been considered on Page V-12, Alternative 2. Drawdowns for fish management purposes, though as not yet used at Lake Shelbyville, are proposed in the Master Plan, Appendix D, Lake Shelbyville Fish and Wildlife Plan. This activity will be coordinated with the State's Reservoir Fisheries Biologist.

The alternative proposing increased fish and wildlife management is a desirable alternative as stated on Page V-18. It is questionable, though, that increased management would have no impact on other uses. The alternative proposing only primitive types of recreation development is unacceptable. To restrict future recreational development to fishing and hunting and other "primitive" uses would not fully utilize the recreation value of these public lands located in an area of the country where such lands are scarce. The wishes of all users are listened too. The large beaches built by the Corps are heavily used and the majority of users are local people. Alternative #4 would not allow these beaches. The Class A campgrounds built by the Corps and building by the State and used mainly by people within a 50 mile radius of the lake, would not be built. The large concrete ramps would not be built which would not please many local bass fishermen.

Comment: Consideration might well be given to a total integrated plan of operation for the three major projects on the Kaskaskia River (Lake Shelbyville, Lake Carlyle and the Navigation Project). We ask the following question, "Might not all purposes of the three projects be better served by providing make-up water in the navigation pool by a pumping from the Mississippi River and eliminating the need for navigation water storage in the lakes?" In view of the great differential in the annual navigation and recreational benefits in the lakes ($36,000 for navigation and $4,969,000 for recreation at Shelbyville) and a reverse differential for the navigation project ($7,115,000 for navigation and none assigned to recreation). When recognized, of course, that recreation is not a project purpose. There will, however, be some recreational benefits.

Response: In formulating the navigation project one alternative investigated was to meet the navigation demands by pumping water from the Mississippi River. This alternate plan was not determined feasible.

Comment: In conclusion, we feel that the draft statement does present an excellent source of information and covers most major environmental considerations. Our comments are made to strengthen what weaknesses we have found. We hope they are given proper consideration. We would be pleased to discuss any or all of the foregoing with your office.

Response: Comment noted.

(18) Illinois Department of Conservation, Charleston, Illinois.

No comments have been received.

(19) Illinois Department of Business and Economics Development, Springfield, Illinois.

No comments have been received.

(20) Illinois Archaeological Survey, University of Illinois, Urbana, Illinois.

Comment: I am writing to you regarding the Draft Environmental Impact Statement on the operation and maintenance of Lake Shelbyville, Illinois. Although you have mentioned the archaeological work undertaken by the University of Illinois in the lake area prior to construction of the reservoir, the Draft EIS does not mention the possibility of shoreline or bank erosion on existing archaeological sites. Although sites of shoreline erosion are indicated on Plate II-20, I would suggest that an archaeological site reconnaissance survey be undertaken in these areas to see if any archaeological sites are so affected, and, preferably, the survey should include the entire existing bankline of the lake. It has been brought to my attention recently that at least one archaeological site is being affected by erosion.

Response: The St. Louis District is aware of the potential erosion damage that may be occurring on archaeological sites at Lake Shelbyville. We have contacted the Illinois Archaeological Survey and requested from them a proposal to conduct a shoreline survey of the lake. We will undertake necessary protective - recovery actions once the survey is made.

(21) Illinois Environmental Protection Agency, Springfield, Illinois.

No comments have been received.

(22) Illinois Natural History Survey, Urbana, Illinois.

Comment: The Draft Environmental Impact Statement of Operation and Maintenance of Lake Shelbyville, Illinois, was directed for review to both the Survey's central office in Urbana and its field laboratory at Sullivan. This review will serve as a response for both relative to the natural history aspects of the Statement.

In general, the Statement seems to be quite complete, very comprehensive and basically sound. However, members of the Survey staff have brought a number of omissions and inaccuracies to my attention. While a number are quite minor, several are rather significant:

Comment: Volume I - Page I-27, par. 2. The Survey and the Department of Conservation cooperate in managing the fish nursery pond which the Survey constructed and operated for several years. However, the Survey monitors stream and lake water quality.

Response: Concur, Page I-24, Para. 4, has been changed.

Comment: Par. 5. The 200 acre marsh area is operated jointly by the Survey and the Department.

Response: Concur, the last paragraph, Page I-24, has been changed.

Comment: Page I-28, para. 3. There are actually 10 test sites at normal pool stage for monitoring parameters of water quality: 4 in the lake, 5 in tributaries, and one below the dam. The results of these investigations are not necessarily coordinated with the State's Reservoir Fisheries Biologist.

Response: Concur. Para. 2, Page I-25, has been changed.

Comment: Plate II-12. The Survey's monitoring station no. 10, located at the Illinois route 121 bridge over the Kaskaskia about a mile north of Allenville, is not shown on the plate.

Response: Plate II-12 has been changed to show monitoring Station #10.

Comment: Page II-32, par. 4. One could infer from this paragraph that the Kaiser Chemical Compnay is a constant source of spilled phosphates. This may not be a fair conclusion because Station 5 is also behind Sullivan's sewage treatment plant, an equally possible source of continued high phosphorus levels.

Response: Concur. Para. 3, Page II-30, has been modified.

Comment: Page II-37. Should not Illinois State Water Supply be Illinois State Water Survey?

Response: Yes, change has been made in text.

Comment: Page II-38, par. 4. It is not clear which "other migrant birds" are meant by the statement. For many species of birds and for bats, the reservoir may have effectively eliminated their "appropriate habitat" in the lands now flooded.

Response: "Other migrant birds" would include birds such as the various shorebirds which frequently use the shoreline and mudflats of the lake. We concur with the second sentence of the statement since one type

of environment cannot be the habitat for all species of animals. Each animal species has its own niche which includes all the necessary life sustaining features required for that animal. Construction of the lake may have changed the habitat for some of the creatures in the basin. However, the operation and maintenance of the lake does not drastically change the habitat of the general vicinity of the lake to the point of eliminating appropriate habitat of animals now existing in the area.

Comment: Page II-45, par. 1. The osprey is probably not as abundant as is implied here. The shrews are ignored in this list of common forest mammals and are also omitted from the list of mammals in other habitats (II-46) although they are identified in vol. II, Table F-5.

Response: These paragraphs are a general discussion of habitats and are not meant to thoroughly list all animal species.

Comment: Page II-47, par. 2. Skunks and raccoons, among others, should be added to the list of mammals found in cultivated fields.

Response: Concur. Skunks and raccoons have been added to Para. 8, Page II-42.

Comment: Although white-tailed deer are mentioned in one or more habitats, we find little or no discussion of them in the wildlife resources section.

Response: Concur. Deer hunting has been added to the wildlife resources section, Page II-46, last paragraph.

Comment: Page II-49, par. 1. Perhaps conditions other than a requirement for cold water are more responsible for the failure of northern pike to "do very well". Indeed, the growth of fish planted in Lake Shelbyville has been exceedingly good.

Response: Concur, Para. 3, Page II-44, has been rewritten.

Comment: Page II-53, par. 2. Crappies have become established and have been providing a fishery since impoundment.

Response: Concur. The discussion on Page II-47, Para. 4, has been modified.

Comment: Page V-15, Alternative 1. We recommend the utilization of the unharvested commercial fish population as needed to control their numbers. We do not recommend managing the reservoir to enhance this population nor do we believe a local processing plant would be economically profitable because of the relatively low volume and short season.

Response: Concur.

Comment: Page V-18, Alternative 2. We suggest the development of several additional subimpoundment marshes for rearing of fish. These

valuable tools may aid in the maintenance of adequate population of large-mouth bass, walleye, and channel catfi and can be used as well for waterfowl marshes. Fluctuations in lake level would have to be reduced in order for them to be effective on a yearly basis.

Response: The Illinois Department of Conservation has plans to develop other subimpoundments for waterfowl-fisheries management. The St. Louis District will cooperate and assist the State in this type of development.

Comment: Additional funds should be allocated for fish population studies. The Survey's long term studies of impoundments indicate rapid and extensive drawdowns implemented on a regular schedule constitute a useful means for maintaining an adequate predator-prey ratio in the lake. To be effective, the drawdown should be adequate to reduce the su area to about one-half of the normal pool or to an elevation of abou 83' at 5 year intervals.

Response: The Illinois Department of Conservation is responsible for the fisheries management program. We agree that they should alot additional funds for fish population studies. As stated on Page I-24, lake drawdowns have been proposed in the Master Plan, Appendix D, Lake Shelbyville Fish and Wildlife Plan. This activity will be coordinated with the State's Reservoir Fisheries Biologist.

Comment: Page VIII-1. "Illinois Department of Natural History" should be "Illinois Natural History Survey Laboratory".

Response: Correct; Page VIII-1 has been changed.

Comment: Pages IX-1 to IX-14 inclusive. The bibliography needs a thorough reexamination and a consistent style be adopted for citing literature. There are errors in authors names and initials, and the identifications of the sources of articles are incomplete. For example - citation no. 11, page IX-1, "Brigham A.R., W.U. Brigham and D.W. Dufford March, 1972. Water Quality Investigations in the Lake Shelbyville, Illinois Basin. Illinois Natural History Survey Laboratory, Sullivan. 32 pages." might better read "Brigham A.R., W.U. Brigham and D.W. Dufford. March, 1972. Water Quality Investigations in the Lake Shelbyville, Illinois Basin. Illinois Natural History Survey unpublished report to U. S. Army Engineer District, St. Louis, 32 pages."

Response: Noted.

Comment: Table F-1. Such species as elder, grape, greenbrier, osage-orange, poison ivy, dewberry, and sumac should also be identified as being species important to wildlife for food or cover. Cinquefoil is listed here as a woody plant. Gleason, Fernald, etc., consider it to be an herb.

Response: Concur. Table F-1 has been modified.

Comment: Table F-5, page F-17. Scientific name of striped skunk is misspelled. Should be Mephitis mephitis.

Response: Concur. Table F-5, has been modified.

Comment: Table F-6, page F-19. The order of listing seems to be random. It would be more useable if the listing is a natural sequence of families with the species of each family alphabetized to generic and specific names.

The common name for Lepomis microlophus, Redear Sunfish, is not hyphenated.

The common name for Moxostoma macrolepidotum is Shorthead Redhorse, not Northern Redhorse.

The common Shiner Notropis cornutus probably refers to the Striped Shiner. Notropis chrysocephalus which was elevated from a subspecies of N. cornutus to specific rank by C.R. Gilbert, 1964, Bull, Fla, St. Mus., Biol. Sci., 8 (2) : 157.

The scientific name for the Warmouth is Lepomis gulosus, not Chaenobryttus aulosus.

The spelling of the scientific name for Walleye should be Stizostedion vitreum vitreum.

Additional species collected from Lake Shelbyville by Survey personnel which should be added to the list include:

Striped shiner	Notropis chrysocephalus
Suckermouth minnow	Phenacobius mirabilis
Highfin carpsucker	Carpiodes velifer
Lake chubsucker	Erimyzon sucetta
Spotted sucker	Minytrema melanops
Tadpole madtom	Noturus gyrinus
Pirate perch	Aphredoderus sayanus
Mud darter	Etheostoma asprigene

Response: Concur. Table F-6 has been modified and amended.

Comment: Page F-22, par. 2. Stinauer (1964) is understood to have collected by the rotenone, potassium permanganate method in addition to seine hauls.

Response: Concur. Page F-23, Para. 2, has been modified.

Comment: Page F-23, par. 4. The statement, "Tributary streams ... probably will experience little change in their fish fauna" is untrue and ignores the many species of small fishes whose habitats have been eliminated.

Response: The statement is true. The operations and maintenance of Lake Shelbyville will have only minor effects on tributary streams, the major effect took place when the dam was constructed and the lake was formed.

Comment: Table F-10, page F-27. This list is incomplete and the Survey does not agree with the projections given relative to which will disappear and which will survive in a lake habitat.

Response: Concur. Table F-10 has been amended based on information supplied by the Illinois Department of Conservation Project Task Force.

Comment: Page F-30. The walleye stocking number on May 6, 1971, should read 1,020,000.

Response: The fish stocking record on Page F-31 has been changed.

Comment: Table F-11, page F-36.

Noeomis biguttatus should be Nocomis biguttatus.

Notropis bopps should be Notropis boops.

Notropis c. chrysocephalus is now changed to Notropis chrysocephalus.

Response: Concur. Table F-11 has been modified.

(23) Mr. Anthony Dean, State Historic Preservation Officer for Illinois, Springfield, Illinois.

Comment: On page II-61, the Statement correctly observes that there are no National Register sites in the lake area. A Review of Inventory of Architecture in Shelby County shows that numerous structures in Shelbyville have been identified by the Illinois Historic Structures Survey as of historic importance. Any of these structures could at some future date be nominated to the National Register.

Response: Comment noted.

Comment: The Inventory of Historic Landmarks for Moultrie County has been completed and no historic landmarks are recorded in the project area. The Inventory of Historic Landmarks for Shelby County has not been completed as of this date. The Director of the Illinois Historic Landmarks Survey should be contacted for his input on this matter.

Response: A copy of the Draft EIS has been sent to the Director of the Illinois Historic Landmarks Survey plus a copy of Mr. Dean's comments.

Comment: The letter from Dr. Charles Bareis, dated July 29, 1974, emphasizes the need for an archaeological reconnaissance party to survey the area. I have to date received no report of this survey.

Response: Dr. Charles Bareis of the Illinois Archaeological Survey has been previously contacted and as stated, recommended an archaeological site reconnaissance of the lake shoreline. His letter of July 29, 1974, can be found in Part IX of this statement. The Illinois Archaeological Survey has been contacted and a proposal to conduct a shoreline survey of the lake has been requested. We will undertake necessary protective-recovery action when the survey is made.

Comment: Before the Department of Conservation can sign off on the project, three requirements remain to be fulfilled:

1. Clearance from the Director of the Illinois Historic Structures Survey that the project will not affect historic structures in Shelbyville, a listing of these structures is supplied herewith.

2. Clearance from the Director of the Illinois Historic Landmarks Survey to the effect that no historic landmarks in Shelby County will be affected by the project.

3. Clearance from the Director of the Illinois Archaeological Survey to the effect that no archaeological sites will be affected by the project.

Response: As requested by the State Historical Officer, copies of the Draft Environmental Statement and a copy of his letter have been sent to the Directors of the Illinois Historic Structures Survey, Illinois Historic Landmarks Survey and the Illinois Archaeological Survey. Their comments will be forwarded to Mr. Dean. The Illinois Archaeological Survey has been contacted before and their comments can be found in Part IX of this statement.

(24) Shelby County Board of Supervisors, Shelbyville, Illinois.

No comments have been received.

(25) Moultrie County Board of Supervisors, Sullivan, Illinois.

Comment: This tome is a monumental compilation of facts worthy of any interested individuals attention - magnificently done, thoughtfully prepared, efficiently organized, and fairly presented. I am most grateful for the opportunity to give it attention and find it most thoughtful and considerate of the District Engineer and the Corps to include the involved counties and their officers in their deliberations.

Response: Noted.

Comment: In order to place any comment to follow in the proper perspective, let it be understood that these observations are not as the result of the deliberations of the Moultrie County Board nor have I been specifically authorized to make any summations representing the Moultrie County Board's position. The following remarks are mine alone and I can but hope that the members of the Moultrie County Board concur.

Response: Noted.

Comment: Regarding planned construction (I-13) the Corps is certainly to be applauded in it's efforts to expand camping and picnic facilities and we most definitely hope that the Corps will be able to facilitate and expedite tent camping and boat camping areas as well as the Ecological study areas and cabin facilities. We want to encourage this type of expansion and feel it is incumbent upon us to discharge our responsibilities expeditiously so that Moultrie County will be looked upon favorably for new construction and expansion in the above listed facilities as well as the resort type development.

Response: Noted.

Comment: (I-27) We salute your efforts to establish a no wake zone of 300 feet from the shoreline and without any doubt this is a fundamentally sound policy but in our opinion, regretfully, few people are aware or observe this regulation. May we suggest that the regulation be more widely circularized as it is quite apparent that many well mannered and observant boatmen reduce their speed in the marked areas but in the absence of indicators run at high rates of speed close to shore. Perhaps more publicity of this laudable policy associated with some judicious punitive efforts would create a healthy observance of this ordinance.

Response: Noted and concur.

Comment: (III-2 Paragraph II) We certainly subscribe to the sentiments expressed by this paragraph and recognize our increased responsibilities on a county level as particularly to be noted by the increased road usage and the increased need for policing activities by the Sheriff and his staff. We do indeed take cognizance of our responsibilities and hope that our attempts to upgrade the Sheriff's office with increased personnel, increased salaries, increased equipment and last, but not least, by the establishment of the merit system in accord with the recommendations of the Illinois Law Enforcement Commission will be productive of material improvement in law enforcement, crime deterence and promotion of safety.

Response: Noted.

Comment: With regards increased road usage we are pleased to advise you that Moultrie County is going forward with plans to pave 3.7 miles of the Bruce-Findlay road from Rt. 32 west and thus we feel we are honoring our commitment to responsible local governmental involvement in establishing the excellence of Lake Shelbyville. Moreover, we are mindful and deeply grateful for the attention and cooperation the Corps has extended Moultrie County in the form of the joint effort to improve the approach roads to Whitley Creek and Wilborn Creek Areas. We feel this is a manifestation of your continuing desire to cooperate with local government to solve local problems in which you may be tangentially involved and feel that we have accepted the challenge by proceeding with the planning and construction of these roads with the full knowledge that we are mutually interdependent in this as well as many other concurrent problems. For what we feel is an

outstanding job in highway planning, design and liaison with the Corps a great deal of credit must be given our Moultrie County Highway Engineer, Ben McRill P.E.

Response: Noted.

Comment: (III-3 III-8) Pursuant to the above comments we feel that even though direct benefits to the county may not be entirely obvious and apparent, as indicated by this study, nevertheless the intangible benefits of community health, p. gress, modernization, and many other factors of remarkable import will make Lake Shelbyville a tremendous asset over many years particularly if we manage our affairs responsibly.

Response: Noted.

Comment: Finally we would not have the temerity to suggest to the Corps methodology of management of the reservoir for we have neither the over riding problems, nor the consumant, ultimate and protean responsibility in the operation of this difficult project but for the very reason that our view is narrower, and our interests primarily local, we would like to encourage one of the management alternatives most beneficial to recreation in which the level of the pool is held more or less constant at a level approximating 600 feet m.s.l. recognizing that, even so, there will be variations in extremes of meterological conditions. Such alternate methods of operation have been succinctly set out in the scholarly discussion of alternatives to which we would like to call attention. The severe variation of levels this year emphasize the problems of marina operators, erosion control, park and ramp maintenance, downstream flooding and clearance of bank debris. The last will be a monstrous obstacle to seemly bank management. (Could we develop a concomitant local project to assist in driftwood cleanup and bank beautification)?

Response: While holding the level of the lake at a more or less constant level approximating 600 feet m.s.l. would benefit local lake interest it would adversely effect downstream interest. Similar alternatives have been described in Section V of the statement. The high lake levels this year as stated in Section IV, have had a serious adverse effect on the lake's shoreline. Bank cleanup and rehabilitation within heavy use areas is being carried out by Corps and State of Illinois personnel. The majority of the shoreline, though, will have no work done to it. The cost of such a project is prohibitive. Some reofrestation work is being considered. This would include aerial seeding, if possible, and seedling planting of water tolerant trees.

(26) Shelby County Zoning Administor, Shelbyville, Illinois.

No comments have been received.

(27) Moultrie County Planner, Sullivan, Illinois.

No comments have been received.

(28) Kaskaskia River Association, Shelbyville, Illinois.

No comments have been received.

(29) Shelbyville Chamber of Commerce, Shelbyville, Illinois.

Comment: I feel the research on this has been very good and any comments which I could make would be nothing more than congratulations.

(30) Environmental Response, Washington University, St. Louis, Missouri.

No comments have been received.

(31) Coalition for the Environment, St. Louis Region, St. Louis, Missouri.

No comments have been received.

(32) Migratory Waterfowl Hunters, Inc., Godfrey, Illinois.

Comment: Migratory Waterfowl Hunters Incorporated have noted that no specific waterfowl management plans are contained in this Draft Environmental Impact Statement. We have noted, however, that a meeting to devise such a plan will be held with the Illinois History Natural Survey and the Division of Wildlife and Fisheries personnel in December 1974.

Response: Specific, detailed management plans are submitted annually to the Corps by the Illinois Department of Conservation. These plans present the waterfowl management program proposed for the Lake Shelbyville area. A check with Mr. Robert Cottingham, District Wildlife Biologist for the area, revealed that no meeting has been planned for December 1974.

Comment: We fear that the same waterfowl management techniques used at Carlyle and Rend Lakes may be implemented at Lake Shelbyville, and this type of management has proven to be disastrous.

Response: Waterfowl management techniques used at Carlyle and Rend Lakes can hardly be called disastrous. In 1973 according to I.D.C. Migratory Bird Section, Periodic Report No. 6 (January 8, 1974), Carlyle and Rend Lakes were the number one and two ranked waterfowl hunting areas in the State with respect to number of hunters accommodated and number of birds harvested. Similar results were achieved in 1972.

Comment: At Carlyle Lake vast numbers of food-producing oak and hickory trees have been destroyed because of poor management and this definitely is not conducive to good waterfowl habitat.

Response: It is true that due to the flood control operation at Carlyle water has been held high during the summer growing season. The high water has killed most of the oaks and hickories in the bottomlands

which at one time provided wildlife food. Killing of these trees has not been conducive to good waterfowl management.

Comment: We believe that the walk-in hunting areas are discriminatory to our senior citizens and young people. Our senior citizens and young people cannot withstand the physical requirements necessary to hunt the walk-in areas. These areas are in such a location that the Illinois Department of Conservation says "you must have a good set of legs to hunt".

Response: Many areas at Carlyle, Rend or on Lake Shelbyville would require a strenuous walk. However, much of these areas can be hunted by and from boats.

Comment: In the few short years of waterfowl hunting at Carlyle and Rend Lakes, four and possibly more hunters have lost their lives. This is a tragic testimony to poor and improper management. Hunter safety should be of paramount importance in establishing a waterfowl hunting program. Walk-in hunting where the water is more than ten feet deep in some areas certainly cannot be considered safe.

Response: We are, of course, very interested in guarding the welfare of lake users. It is inevitable with the milliions of people that use Corps lakes that accidents will happen. The waterfowl hunt system, as proposed and carried out by the State, does not force anyone to undertake activities that will harm them. General water safety rules should be followed by all persons active on or around water no matter what their particular activity is.

Comment: We have submitted the following recommendations which we feel is the proper format for establishing good quality hunting, hunter safety, and a system that is exceptionally equitable and utilitarian and similar to the system now utilized in most of the other public hunting areas in the state.

1) That Migratory Waterfowl hunting be done only from those sites located and staked by the Illinois Department of Conservation.

2) That these sites be no less than 150 yards apart.

3) That permanent waterfowl hunting facilities be built on these sites.

4) That the Illinois Department of Conservation hold a first-year draw for interested hunters to draw for these blind sites.

5) That the Illinois Department of Conservation have an annual draw for all unclaimed blind sites.

6) That during waterfowl season, those blinds not claimed by the blind builder one hour prior to shooting time be allocated on a lottery basis.

7) That all blind sites be reallocated no less than every two years.

8) That these blind sites be built, brushed, and maintained by the person whose name is drawn at the annual draw.

9) That the Illinois Department of Conservation set a standard for the construction of these blind sites and perform an inspection of these sites no less than three weeks prior to the opening of waterfowl season.

10) That the Illinois Department of Conservation construct a truly, adequate levy system capable of rendering the entire waterfowl areas completely dry during the planting season.

Response: Since the Illinois Department of Conservation has the legislative responsibility and authority, and wildlife management expertise, administration of managed hunt programs within the State of Illinois are under their supervision. The Corps insures that areas are open for recreational use to the public without regard to sex, race, creed, color or national origin and that the program is fair and equitable. The present system of walk-in hunting has been successful in providing high quality hunting and providing lightly restricted hunting opportunity for many citizens of the State. The system at Carlyle provided more hunter trips and birds bagged in 1972 and 1973 than any other public area in the State.

Because of the high variability of the Kaskaskia River stage at the upper end of Carlyle during spring flood times, the cost would be prohibitive to construct and maintain levee around the waterfowl area that would be completely dry during the planting season as recommended in Item 10 above.

(33) The Wildlife Society, Illinois Chapter, Springfield, Illinois.

No comments have been received.

(34) Illinois Wildlife Federation, Blue Island, Illinois.

No comments have been received.

(35) The Coalition on American Rivers, Champaign, Illinois.

No comments have been received.

(36) Illinois Audubon Society, Galesburg, Illinois.

No comments have been received.

(37) The Nature Conservancy, Illinois Chapter, Chicago, Illinois.

No comments have been received.

(38) American Fishery Society, Illinois Chapter, Chicago, Illinois.

No comments have been received.

PART IX

COMMENTS RECEIVED

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

AUG 19 1974

Dear Colonel Peterson:

Thank you for your letter of June 12, 1974, requesting the Department of the Interior to review and comment on the draft environmental statement on the Operation and Maintenance of Lake Shelbyville, Illinois. Accordingly, we have reviewed the statement and offer the following comments for your consideration.

Minerals

The only significant mineral resource in the project area is coal and the commitment of 5 million tons of strippable Shelbyville Coal was made when the reservoir was authorized in 1958. The continued operation of the reservoir and the further development of recreational facilities on presently owned fee land will have no further impact on mining or mineral resources. The statement adequately discusses these points and is acceptable.

Historical and Archeological

We recommend that the final statement present documentation of review by the State Historic Preservation Office of Illinois to insure that no property in the process of nomination to the National Register of Historic Places will be adversely affected by the proposal.

The final statement should also clarify whether or not areas proposed for future construction or alteration were included in the area surveyed by Mr. William W. Chmurny in 1960. In the event they were not included, the final document should specify arrangements for archeological survey prior to construction.

Procedures to be followed in the event unrecorded cultural resources are encountered in the construction and alteration phases should be included in the final environmental statement. Otherwise, we have found the statement generally responsive to the jurisdictions and interests of historical and archeological matters.

Wildlife and Fishery Resources

The statement is generally adequate in respect to its treatment of fish and wildlife resources. In matters concerning lake level management, however, continued cooperation with the Illinois Department of Conservation is required to equate the needs of fishery resources with those of flood control and navigation. It is especially important to establish winter lake levels and drawdown procedures that will permit full development of the potential fishery of Lake Shelbyville.

Geologic Conditions

Potential environmental problems related to geologic conditions appear to have been adequately considered in the draft environmental statement. The statement appears unusually comprehensive in most respects and would be an excellent model for future statements for similar projects.

The proposed action summarized on page vi (item #2) should be the continued operation and maintenance of the project, as this action will have been carried on for 49 months as of August 1, 1974, (p. III-1).

The description of relocated facilities mentions power lines, telephone lines, pipelines, and a cemetery, but no mention is made of people, farms, or other businesses (p. I-11). A complete reading of both volumes failed to provide any information on displacements or their impact. It would be appropriate to include this information in the section of "Relocated Facilities" in the summary of environmental impacts (p. vi), and possibly in the historical discussion of "Environmental Changes Resulting from Settlement and Development" (p. II-39 to II-41). The latter discussion mentions the slow settlement of the Kaskaskia River valley starting about 1650, and the fact that by the 1700's there were a few farms and sawmills along the river (p. II-39). However, no mention has been made here or elsewhere of the impact of lake construction on people when, in the space of a few years, all those who had settled on the 34,408-acre project area were presumably forced to leave, some of them probably including the descendants of the early settlers of the 1700's.

The section on Alternatives (Part V) includes a discussion of two alternatives for shoreline treatment, one being to allow flood-killed trees to fall naturally and decompose except in areas of heavy use,

and the other being to install protective riprap on heavily used banks but to take no action elsewhere. Both of these alternatives appear to be in present practice, and their continued use is evidently proposed. Since no real alternatives to these practices have been explored, it would be appropriate to include them in the description of the proposed project (Part I) rather than in the section on Alternatives.

It would be helpful to refer to the Appendices on geology and soils in appropriate sections of Volume I.

The draft statement is reasonably adequate and accurate in the evaluation of the environmental impact of the proposed action on water resources of the area.

<u>Summary</u>

We find that the draft environmental statement contains a great deal of comprehensive information regarding environmental impacts related to geologic conditions and minerals. However, we also find that the statement lacks in its assessment of environmental impacts in other areas as we have mentioned. We wish to emphasize that the comments rendered be utilized in the environmental statement to support the impacts presented.

We appreciate the opportunity to review and comment on this statement and hope that our remarks will be of assistance in preparing the final environmental statement.

Sincerely yours,

Assistant Secretary of the Interior

Colonel Thorwald R. Peterson
District Engineer
Department of the Army
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
TELEPHONE (215) 352-5800

8400
July 26, 1974

Thorwald R. Peterson, Colonel, CE
District Engineer
St. Louis District
210 N. 12th Street
St. Louis, Missouri 63101

Re: LMSOD-R
Lake Shelbyville, Ill.
Draft Environmental Statement,
Operation & Maintenance

Dear Colonel Peterson:

The above statement, sent to our Milwaukee office, was referred to us for comment as no National Forests were involved. Our interest is in forested parts of state and private land.

The impact of Flood Control Storage and the anticipated rise of the lake level to 615 feet is described only in general terms. The acreage of trees that will be lost along the 172 miles of shoreline and the impacts of that loss should be estimated.

Under New and Continuing Construction (P. III-31) there is no mention of erosion control during construction, or amount of impact on woodland.

Under Project Purposes, Fish and Wildlife concerns are included, but not woodland, which has a positive value for water regulation and recreation in addition to its role as wildlife cover.

We appreciate the opportunity to review and comment on this statement.

Sincerely,

for ROBERT D. RAISCH
Director

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P.O. Box 678, Champaign, Illinois 61820

July 29, 1974

Colonel Thorwald R. Peterson
District Engineer
U. S. Army Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel Peterson:

The Draft Environmental Impact Statement on the Operations and Maintenance of Lake Shelbyville, Illinois that was forwarded to the State Conservationist, Champaign, Illinois on June 12, 1974 has been reviewed as requested and our comments are submitted for your consideration.

Shoreline or Bank Erosion - Erosion especially shoreline or bank erosion is a serious and increasing problem in the project as indicated on pages I-20, Plate II-20, II-16, II-70, III-16, III-19, III-31, IV-1, IV-3, and V-35. Under Preservation of the Project Area's Natural Character we read "To date, the only successful way to control bank erosion has proven to be the lining the shore with riprap." Under impact of Resource Management we note (III-19) "No management techniques for control of widespread erosion have been implemented." A specific resource management program to deal with soil and water conservation problems on the shoreline, in the heavy use recreation areas, along road cuts and other disturbed areas will be an essential part of maintaining a quality environment for the area. If you have not already done so you may wish to review the recommendations found in the Soil Conservation Service technical guide relating to the establishment of vegetation on critical areas. Consideration could be given to placing a soil conservationist or agronomist on the Lake Shelbyville Resource Management staff to help with land use, erosion and sediment control work. One potential would be to establish some vegetative field trials for erosion control on the 170 miles of shoreline and other critical areas.

Land Treatment in the Watershed, Page II-46 - Consideration should be given to providing financial and technical assistance for an accelerated soil and water conservation program in the Lake Shelbyville watershed. The Soil Conservation Service can provide a Conservation Needs Inventory showing the soil and water conservation work needed in the watershed. The soil and water conservation districts in the watershed could be contacted concerning their cooperation in the accelerated land treatment program. The Soil Conservation Service estimates

a need for additional conservation treatment on 340,000 acres of cropland, 35,000 acres of pastureland, 31,000 acres of woodland, and 7,000 acres of other land above the reservoir.

Under the Local Setting (II-3) first sentence of second paragraph in discussing glacial geology reads "because it is so young there is little erosion." Suggest it read "because it is so young there is little geological erosion." There is soil erosion in the Upper Kaskaskia drainage basin.

Water Quality (I-28) and (I-29). Is the volume of sediment coming into Lake Shelbyville being recognized and monitored as a detriment to the environment? We note turbidity and chemicals attached to soil particles are being monitored but see no reference to volume of sediment or rate of sedimentation.

Page II-19 Table II-1 gives the geologic timetable for sediments in the study area. Approximate rate of sedimentation under existing watershed management conditions would be valuable in current project Operation and Management.

Land Use Planning (II-65) "Since 1970, 18 separate sub-divisions have been platted adjacent to federal lands on the lake." Some of the soils in the proposed sub-divisions or those yet to be planned could have severe limitations for on-site septic systems. The Soil Conservation Service has interpretive soils information which it is pleased to make available to county planning commissions, health departments, zoning boards and others showing the suitability or limitations of specific soil types for agricultural use, septic tank filter fields, recreation use, highway subgrade materials and other land uses.

Impact Downstream, Page III-14 - In working with landowners downstream our technicians have heard complaints that a continuous flow at a high rate of release seems to cause flooding of slough areas and makes it impractical to plan good agricultural drainage for lack of proper outlets when needed to plant, grow and harvest a crop. There is the potential if this situation continues, it can cause landowners to farm their upland soils beyond their capability to the long term damage of both the land and the community.

Interpretive Center (V-35) - If an interpretive center is established, consideration could be given to explaining the unique geology of the area namely the Shelbyville moraine and its influence on the soils and native vegetation of the area. The Soil Conservation Service would be glad to cooperate in locating profiles of the typical soils along road cuts or in pits.

General

Page I-29, first paragraph - Suggest line 2 include grasses in addition to trees and shrubs.

Pages II-16 and 17 - Properties of Soils - Drummer Silty Clay Loam should be included in the list due to the large acreages included in the watershed.

Page II-39 - Suggest the word "exploited" in last paragraph be changed to "Used" for cultivation until about 1830 when the steel plow became available.

Page II-39 - General Impact of Habitat Modifications, line 8 - Suggest the word "extensive" be substituted for "excessive."

Page II-40 - Suggest deleting the last sentence of third paragraph "Agricultural pollution and flooding have been aggravated by the rapid runoff resulting from tile drainage." This may be more of an opinion than fact.

Page II-73 of Volume I, Planning and Zoning - Last sentence on the page indicates that both Shelby and Moultrie counties have county planners. It is our understanding that Shelby county has a Zoning Administrator but no county planner. You may wish to check this out.

Plate II-14 - Is the legend on this map of Habitat Types - 1974 consistent with the text discussion? Is the "agriculture" legend meant to be "cropland" as discussed on page II-46?

Technical Appendix, Page C-1 Soils. Shouldn't the plate referred to be Plate II-1 rather than Plate II-4 in the paragraph discussing glacial drift and moraine?

The loss of prime agricultural land is of concern. It would strengthen the statement if it included the estimated acreage of prime agricultural land that is expected to be taken by additional development over and beyond the project lands.

If you have questions concerning the soils, erosion and sediment control, vegetative seedings, woodland or wildlife plantings, tree and shrub plantings for noise barriors, agricultural water management or any other soil and water conservation work, please do not hesitate to get in touch with our Soil Conservation representative in the county involved.

We appreciate the opportunity to review and comment on this project.

Sincerely,

Arlon L. [illegible], Acting

Howard W. Busch
State Conservationist

OFFICE OF ECONOMIC
OPPORTUNITY

EXECUTIVE OFFICE OF THE PRESIDENT
Region V
300 South Wacker Drive
Chicago, Illinois 6060[illegible]

JUL 9 1974

Mr. Thorwald R. Peterson
Colonel, CE
District Engineer
Department of the Army
St. Louis District, Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Mr. Peterson:

Thank you for your letter dated June 12, 1974, with the enclosed Draft Environment Statement for the Operation and Maintenance of Lake Shelbyville, located in Shelbyville, Illinois.

Our review indicates no need for OEO comment on this draft document.

Sincerely,

Glenwood A. Johnson
Acting Regional Director

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U S COAST GUARD (G-WS/73)
400 SEVENTH STREET SW
WASHINGTON, D.C. 20590
PHONE (202) 426-2262

JUL 22 1974

Colonel Thorwald R. Peterson
District Engineer
St. Louis District, Corps of
Engineers
210 N. 12th Street
St. Louis, Missouri 63101

Dear Colonel Peterson:

This is in response to your letter of 12 June 1974 addressed to the Federal Highway Regional Administrator, Homewood, Illinois concerning the draft environmental impact statement on the Operation and Maintenance of Lake Shelbyville, Illinois.

The Regional Federal Highway Administrator has reviewed this impact statement for the Department of Transportation and he has the following comments to offer:

> "The statement appears to recognize most of the environmental consequences of the proposed action. However, we do feel that something more is needed than mere recognition of probable adverse effects of increased traffic on area-wide highway systems. Discussion such as that on pages II-68, 73 and 75, points out the inadequacy of many local roads for carrying increased traffic volume and loadings, yet fails to discuss any intent to assist or cooperate with highway officials in solving the problem of generated traffic on those roads. It is suggested that before plans are committed for added development of lake access areas and campgrounds, the Corps of Engineers should cooperate in assuring that adequate rights-of-way are reserved for future highway needs.
>
> Regarding the concept of the environmental statement, it is our feeling that the Corps of Engineers should assume the position of lead agency as set forth in the CEQ guidelines. If this were done, the necessary adjustments of highway systems could be considered in proper perspective, and it would not be necessary for highway agencies to make their assessments of environmental impact on a piecemeal basis and on questionable section lengths in the area of impact of Lake Shelbyville.

At a minimum the statement should include information on the projected usage of the various recreational facilities to be provided at Lake Shelbyville, including vehicle occupancy rates and/or vehicle trips for each of the lake access sites and campgrounds. This information will be vital to any systematic planning of highway needs in the proximity of the lake."

The Department of Transportation has no other comments to offer nor do we have any objection to this project. The final statement, however, should address the concerns of the Federal Highway Administration.

The opportunity to review this draft statement is appreciated.

Sincerely,

R. I. PRICE
Rear Admiral, U. S. Coast Guard
Chief, Office of Marine Environment
and Systems

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
1 NORTH WACKER DRIVE
CHICAGO, ILLINOIS 60606

Colonel Thorwald R. Peterson
District Engineer
U.S. Army Engineer District, St. Louis
210 North 12th Street
St. Louis, Missouri 63101

AUG 26 1974

Dear Colonel Peterson:

We have completed our review of the Draft Environmental Impact Statement (EIS) for the Operation and Maintenance of Lake Shelbyville in Shelby and Moultrie Counties, Illinois, as requested in your letter dated June 12, 1974. We have previously reviewed your proposed wastewater disposal facilities and practices at Lake Shelbyville's Access Areas; our February 26, 1974 comments included a determination that the proposed facilities and practices were partially adequate. We have classified our comments on the Draft EIS as Category LO-2. Specifically, this means that we have no major objections to the proposed action; however, additional information is required to assess the total impact of the project. The classification and the date of our comments will be published in the *Federal Register* in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act. The following comments should be addressed in the Final EIS.

> From our field review of the project area, it is evident that the current major problems at Lake Shelbyville are erosion and high water levels. These problems discourage and restrict many recreational opportunities such as swimming and boating. Erosion along the lake shoreline due to high water, wave action, boat wakes; and erosion along park roadways, service roads and especially around the access wastewater disposal plants require immediate attention in order to curtail sediment transport into the lake. It appears that stricter enforcement of all contract work is required to effectively control erosion during and after construction.

> Lake Shelbyville lies within the Kaskaskia River Sub-Basin which is part of the Upper Mississippi River Basin. This area was included as part of the Upper Mississippi River Comprehensive Basin Study (UMRCBS) and there are no apparent conflicts between recommendations made as a result of the UMRCBS and current O&M practices at Lake Shelbyville. At this time there is no 303(e) water quality management plan which includes the project area. It is assumed that the forthcoming 303(e) plan will include all O&M activities at Lake Shelbyville.

Past water quality data for the Lake Shelbyville area should be included in the EIS. A water quality monitoring program for Lake Shelbyville should be developed with appropriate state and local officials to detect potential water quality changes in the lake and assure future compliance with applicable water quality standards. According to Dr. Allison Brigham of the Illinois Natural History Survey, overall water quality in the lake has been improving steadily over the past two years. Dr. Brigham has reported that while phosphorus levels in some areas exceed water quality standards, she believes that this condition is temporary and should not exist when water levels are at normal recreation pool elevations. It is our opinion that the major concern related to water quality in the project area is that of nutrient input as a result of fluctuating water levels, agricultural runoff and erosion. Water quality problems of low dissolved oxygen, algal blooms and hydrogen sulfide production are a direct result of these autochthonous inputs.

With regard to local municipal sewage treatment plants (STP) discharging directly or indirectly to Lake Shelbyville, treated effluent from the Sullivan STP (primary treatment) and Findlay STP (secondary treatment) exceed allowable secondary treatment requirements for BOD. However, the Kaskaskia River Basin is at this time very low on the State priority list for wastewater treatment construction grants, and improvement of STP's in the basin in the near future is unlikely. Irregardless, an implementation schedule with the necessary commitments providing for adequate treatment of all point source dischargers upstream of the dam should be adopted as soon as practicable.

The Army Corps of Engineers District, St. Louis have been authorized by the U.S. EPA to discharge from wastewater disposal plants at Lone Point, Whitley Creek, Wilborn Creek, Lithia Springs, Coon Creek, Opossum Creek and Dam East Access Areas to Lake Shelbyville in accordance with NPDES permit conditions effective August 29, 1973. According to a July 25, 1974 letter and attachments from Mr. James A. Petersen, Acting Chief, Operations Division, many of the access area wastewater disposal plants are under construction and are being modified to insure more effective treatment. While we realize that the contractor has not turned over many of the wastewater disposal plants to the Corps for maintenance and operation, these plants are nonetheless operating in a construction phase and

and are discharging to Lake Shelbyville. Such discharges require immediate monitoring procedures in accordance with NPDES permit conditions to insure adequate treatment for the protection of public health. We note that phosphate levels from Whitley Creek, Wilborn and Dan East Access Areas wastewater disposal plants exceed allowable permit conditions and should be brought into compliance as soon as possible. Please inform us when the phosphate removal equipment has been installed.

The contagious fish blood disease and resulting fish kill reported in 1972 was studied by Dr. Warren Brigham of the Illinois Natural History Survey. Dr. Brigham feels that this dramatic occurence was a unique example of population control. The initial filling of Lake Shelbyville resulted in an enormous bass population explosion. Later during winter drawdown the fish were confined in a very limited area and stress conditions resulted. Dr. Brigham believes that it is unlikely that such conditions will reoccur at Lake Shelbyville.

The general cleanliness of assess area grounds and restroom facilities at Lake Shelbyville was observed during our field inspection to be excellent; we believe maintenance crews should be commended. Fish baskets like that installed at the Coon Creek Access Area collect fish wastes generated at "Fish Cleaning Areas" and prevent clogging of wastewater disposal facilities. Such practices are certainly public health oriented and their continued practice and development should be encouraged.

While we recognize the impracicability of prohibiting swimming along all shore areas when beach areas are inundated by high water levels, we request that enforcement of some type be taken to prevent swimming in access area waters directly receiving treated sanitary effluent. Swimming in coves, shore areas or streams receiving treated effluent is a potential health hazard and requires immediate remedial measures.

Our latest inquiry to Illinois EPA revealed that Shelbyville's first permit application submission for certification of the City Dump as an approved landfill was denied. While Shelbyville does have an old State of Illinois Public Health permit, this is no longer recognized as valid by Illinois EPA since it expired July 27, 1974. Shelbyville resubmitted the revised permit application on July 25, 1974; Illinois EPA is currently reviewing it. If a valid permit is not issued prior to the release of the Final EIS,

provision should be made to dispose solid wastes at another site holding a valid permit issued by the Illinois EPA. Approved sites exist in Sullivan, Mattoon, Taylorville, Decatur and other local communities. Future contracts for refuse collection and disposal should require that wastes be taken only to a site holding a valid Illinois EPA permit. Also, we recommend that such contracts contain a termination condition if the contractor disposes of wastes at a site not holding a valid permit.

During our field trip, we found that pump and motor noise from the Lithia Springs Access Area wastewater disposal plant was sufficiently high to cause disturbance to sleeping campers of nearby campsite areas. If it is not possible or practicable to reduce the noise at the site, closure or relocation of certain camp sites to a less noisy area may be appropriate. Until the problem is resolved, campers should be made aware of the disposal plant's intermittent noise impacts before being assigned a camp site in the impact area. We encourage an examination of the other access area wastewater disposal plants and their compatibility with the immediate land use.

We would like to thank Messrs. Larry Meier and John Marzac of your staff for their help and assistance in conducting a field review of the project on June 28, 1974. We appreciate the opportunity to review this Draft EIS. Please send us two copies of the Final EIS when it is filed with the Council on Environmental Quality.

Sincerely yours,

Gary A. Williams

for Donald A. Wallgren
Chief
Federal Activities Branch

Advisory Council
On Historic Preservation
1522 K Street N.W. Suite 430
Washington D.C. 20005

July 16, 1974

Col. Thorwald R. Peterson
District Engineer
St. Louis District
Corps of Engineers
U.S. Department of the Army
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel Peterson:

This is in response to your request of June 12, 1974, for comments on the environmental statement for the Operation and Maintenance of Lake Shelbyville, Illinois. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that your draft environmental statement appears procedurally adequate. However, we have the following substantive comments to make:

> To insure a comprehensive review of historical, cultural, archeological, and architectural resources, the Advisory Council suggests that future draft environmental statements prepared by your district contain evidence of contact with the appropriate State Historic Preservation Officer as well as a copy of his comments concerning the effects of the undertaking upon these resources. The State Historic Preservation Officer for Illinois is Mr. Anthony T. Dean, Director Department of Conservation, 102 State Office Building, 400 South Spring Street, Springfield, Illinois 62706.

Should you have any questions or require any additional assistance, please contact Jordan Tannenbaum at 202-254-3974 of the Advisory Council staff.

Sincerely yours,

Ann Webster Smith

Ann Webster Smith
Director, Office of Compliance

PROJECTS
TASK FORCE

RESOURCES

DEPARTMENT OF CONSERVATION

605 STATE OFFICE BUILDING

SPRINGFIELD 62706

August 29, 1974

Thorwald R. Peterson
Colonel, CE
District Engineer
Department of the Army
St. Louis District
Corps of Engineers
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel Peterson:

The Projects Task Force has reviewed the "EIS - Lake Shelbyville O & M" and has the following comments to make.

When considering what impact the operation and maintenance of Lake Shelbyville will have on the general ecology of the area one point is outstanding; this is the constant abnormal pool fluctuations that have been common since full pool was first reached. These continued fluctuations have caused substantial loss in vegetation, and fish and wildlife habitat. A continuation of this instablility will result in a general decrease in vegetative, fish, and wildlife diversity.

One general observation worth noting is that due to the timing of the report, recent record water levels and subsequent hydrological data were not incorporated. In many places, old predictions of pool levels are misleading and perhaps new tables need to be developed that would aid in enhancing the five project purposes.

The following specific deficiencies, comments, and corrections are noted:

Page I-19 Paragraph 2

Recreation would not be adversely affected if normal pool level was not obtained by May 1. Boating, water skiing, sailing, and swimming are negligible at this time. Fishermen would rather see the water lower. Greater flood storage would thus be available. A gradual rise in pool level to reach a maximum by June 1 would also be very beneficial from the standpoint of fisheries management.

Page I-29 Paragraph 2

This practice would apparently not be needed below the elevation given as water levels above 610 msl have been regular enough to control non-tolerant species.

Page I-27 Paragraph 2

Substitute "fisheries - waterfowl marsh", for fish nursery pond.
Paragraph 5 Line 7
Place "jointly" after operated and add " the Illinois Department of Conservation" at the end of the sentence.

Page I-28 Paragraph 2 Line 1

Substitute "reporductive surveys" for creel census, as a creel census is not conducted annually. Add "angler creel census surveys and other biological investigations are conducted when deemed necessary".

Page I-34 Table

Values given to fish and wildlife benefits are definitely under-estimated (See 1972 National Survey of Hunting and Fishing) Angling alone had a projected expenditure value of nearly one-half million dollars in 1972.

Page II-47 Last Paragraph

Add that in 1964 Stinauer also used - "the rotenone-potassium sampling mehtod".

Page II-49 Paragraph 1

Northern pike cannot be compared to trout as to temperature of water.

The terms "coarse" or "rough" fish should be replaced by the terms "commercial" or "non-game".

Page II-53 Paragraph 1

Incorrect. Crappies are well established.

Page II-64

The S. C. S. table of recreational facilities should be brought up to date.

Page III-18 Paragraph 5

A rise in pool does not result in a suffocation of eggs. This is usually due to the deposition of silt or debris. "Frequent" should precede the word abandonment as not all species will leave the nests when there is a rise in pool level.

Page III-20 Paragraph 3

Some introduced species such as walleye have become moderately successful contrary to this statement.

Page III-31 Paragraphs 5-6

Installation of campgrounds in wooded areas damages ground cover and established trees. This degradation will continue as long as the campground is in operation, and would therefore, not only cause wildlife displacement, but depletion of habitat. Long term use of woodlands for campsites would have the effect of eliminating nesting and den trees.

Page V-18 Paragraph 1

Add to the Carlyle catch the fact that 65% of the catch was buffalo fishes.

Paragraphs 2-4

Many assumptions are made here that are either misleading or invalid.

1) Being a relatively deep fertile lake, it is very doubtful if Lake Shelbyville will be that productive for commercial fishing.

2) It is very doubtful due to limited season and supply, in-availability of technical expertise, and lack of demand that commercial fishing could support the building and operation of a fish meal processing plant.

3) It is doubtful that commercial fishing would create new local jobs as it is a technical skill not found in the area.

4) This is not an attractive alternative and should not be considered.

Page V-19 Paragraph 1

Drawdowns, although unnecessary now, may be of future value and should not be put aside. The relationship made between water nutrients and soil nutrients is not true.

Page V-26 Alternative No. 4

In view of the evidence presented in Plate III-3, this alternative <u>would</u> appeal to a vast majority of present lake users. The report states quite erroneously that limited appeal makes this alternative unfeasible.

Page VI-1 Paragraph 4

This implies that no cognizance is made of "natural" areas. Due to the past land-use practices, few, if any, natural areas exist. Management for wildlife, however intense, would consider the intrinsic value of "natural areas" and undoubtedly assure their perpetuation.

Comments Regarding Volume 2

F-19, Table F-6

This table should be listed in order of families as recommended by the American Fisheries Society Publication #6, page 4.

Northern redhorse now called shorthead redhorse.
Highfin carpsucker should be added to the list.
Common shiner is now called northern striped shiner.
The scientific name of the warmouth is now Lepomis gulosus.

F-22, Paragraph 2

Stinauer found 40 species in the Kaskaskia River, other species by the Illinois Natural History Survey (see F-36). The species list for Lake Shelbyville plus the I.N.H. survey collection totals 69 species, which indicated very little change in the stream population.

F-22, 3rd line

Stinauer used two sampling methods, not one.

F-23, Paragraph 2 Line 6

Incorrect. A substantial thermocline does develop.

F-24, Paragraph 4 Line 2

Recommend using "frequently" instead of "always" which would be incorrect.

F-26, Table F-8

The reader is left to wonder what made up the other percentages of fishes caught. The addition of the carp, drum, and bowfin caught would make the table more complete. The second year of creel data from Carlyle is more comparable than the first year, since very little water was in the lake.

F-27, Table F-10

Disagree with ratings.
Silvery minnow should be a ?
Suckermouth minnow should be a ? instead of a +.

Bluntnose minnow should be a + instead of an 0.
Creek chub should be a ? instead of a +.

F-30

Could add 1974 stockings.
12,660 1-3 inch northern pike
50,000 1-1.5 inch smallmouth bass

F-30

1,020,000 instead of 020,000 walleye fry stocked on May 6.

H-10

Use figures are widely different between Corps figures and the Illinois Department of Conservation. For example, boat fishing counts (Corps) was 11,100 for Memorial Day, 1973. In 1972, only 54,184 boat fishermen were projected for April 17, to October 31, 1972. Fishing was much better in 1972 than early 1973.

Following are several general recommendations and information that should aid in the final statement:

1) Nutrient levels contrary to the draft are not high enough to contribute a serious or even moderate state of eutrophication.

2) The entire area needs to be marked to help reduce problems of management, trespass and encroachment.

3) Cost analysis throughout the report fail to consider various recent variables to which include:

    a) Recent repairs to the dam

    b) Developments by the State of Illinois and private businesses that have been damaged and delayed due to fluctuating water levels.

    c) Timber losses caused by high water.

    d) Increased erosion and siltation due to high waters which leads to a reduced life span and a decrease in the cost benefit ratio.

    e) Agricultural damage below the dam due to flooding has increased in the last four years. This has some negative value.

4) A reforestation program should be undertaken to reclaim some lands where timber losses have occurred.

5) More attention should be given to maintaining the high productivity levels at the upstream end of the Lake via stabilization. This area provides a much needed transition zone between stream and lake ecosystems.

The main objection that can be offered is one of management. The anticipated products of a multipurpose reservoir are not being realized at Lake Shelbyville. In attempting to comply with the demands of the five various functions, none is properly treated, and each is degraded. What is needed is a re-evaluation of priorities that would lead to a more concise management program. Each specific purpose must be looked at in relation to all others and not in its own perspective. It is recognized that none of the problems are due to prolonged high water levels in the spring.

In the opinion of the Illinois Department of Conservation, storage for navigation is having an undesirable effect on the other four project purposes. All would stand to benefit if this purpose were down-graded. (Page V-14 alternative 2) The benefit assigned to navigation (Page I-35) is listed as $36,000; far below any of the benefits for the four other purposes. This alone would justify the thesis that a disproportionate amount of total storage is allocated to navigation.

A most useful and enjoyable lake environment could be obtained if a combination of various alternatives were initiated:

1) As mentioned before alternative #2, page V-14 is of benefit to all other project purposes.

2) Alternative #4, page V-10 could prove effective if pool releases were done on a gradual basis. Some sort of release chart could be conceived that would serve to enhance all project pruposes except navigation. This release could include a five year drawdown plan beneficial to fish management.

3) Alternative #2, page V-18 is a very important aspect that would have no effect on other purposes. It should be implemented.

4) As far as present use of the lake is concerned, alternative #4, page V-25, should be implemented. 70% of the use of Lake Shelbyville comes from within a 50 mile radius, and the wishes of these users need to be realized. This alternative need not totally eliminate other recreational activities, but should place restrictions upon them.

Consideration might well be given to a total integrated plan of operation for the three major projects on the Kaskaskia River (Lake Shelbyville, Lake Carlyle and the Navigation Project). We ask the following question, "Might not all purposes of the three projects be better served by providing make-up water in the navigation pool by a pumping from the Mississippi River and eliminating the need

for navigation water storage in the lakes?" In view of the great differential in the annual navigation and recreational benefits in the lakes ($36,000 for navigation and $4,969,000 for recreation at Shelbyville) and a reverse differential for the navigation project ($7,115,000 for navigation and none assigned to recreation). When recognized, of course, that recreation is not a project purpose. There will, however, be some recreational benefits.

In conclusion, we feel that the draft statement does present an excellent source of information and covers most major environmental considerations. Our comments are made to strengthen what weaknesses we have found. We hope they are given proper consideration. We would be pleased to discuss any or all of the foregoing with your office.

We are pleased to have this opportunity to respond.

Sincerely yours,

Ralph O. Fisher

ROF:jj

cc: Task Force

ILLINOIS ARCHAEOLOGICAL SURVEY

109 DAVENPORT HALL UNIVERSITY OF ILLINOIS URBANA, ILLINOIS 61801

Cooperating Institutions:
University of Illinois
Southern Illinois University
Illinois State Museum

July 29, 1974

Mr. Thorwald Peterson
District Engineer
Army Corps of Engineers
St. Louis District
210 North 12th Street
St. Louis, Missouri 63101

Dear Mr. Peterson:

I am writing to you regarding the Draft Environmental Impact Statement on the operation and maintenance of Lake Shelbyville, Illinois. Although you have mentioned the archaeological work undertaken by the University of Illinois in the lake area prior to construction of the reservoir, the Draft EIS does not mention the possibility of shoreline or bank erosion on existing archaeological sites. Although sites of shoreline erosion are indicated on Plate II-20, I would suggest that an archaeological site reconnaissance survey be undertaken in these areas to see if any archaeological sites are so affected, and, preferably, the survey should include the entire existing bankline of the lake. It has been brought to my attention recently that at least one archaeological site is being affected by erosion.

If you wish to have an archaeological site reconnaissance survey undertaken, please contact our office and we will get in touch with one of our affiliates who can prepare a time and cost estimate for this work. Thank you for this opportunity to comment on the Lake Shelbyville EIS.

Cordially yours,

Charles J. Bareis

Charles J. Bareis
Secretary-Treasurer

CJB:mm

STATE OF ILLINOIS
DEPARTMENT OF
REGISTRATION AND EDUCATION
DEAN BARRINGER, *Director*
Springfield
BOARD OF NATURAL RESOURCES
AND CONSERVATION
DEAN BARRINGER, *Chairman*
GEOLOGY ....L. L. SLOSS
CHEMISTRY .... HERBERT S. GUTOWSKY
ENGINEERING ... ROBERT H. ANDERSON
BIOLOGY .... THOMAS PARK
FORESTRY ...... CHARLES E. OLMSTED
UNIVERSITY OF ILLINOIS
DEAN WILLIAM L. EVERITT
SOUTHERN ILLINOIS UNIVERSITY
DEAN ELBERT HADLEY

ILLINOIS NATURAL HISTORY SURVEY

Natural Resources Building
Urbana, Illinois 61801

Telephone: 333-6880
Area Code 217

GEORGE SPRUGEL, JR., *Chief*

July 31, 1974

Colonel Thorwald R. Peterson
District Engineer
St. Louis District, Corps of Engineers
210 North 12th St.
St. Louis, Missouri 63101

Dear Col. Peterson:

The draft Environmental Impact Statement of Operation and Maintenance of Lake Shelbyville, Illinois, was directed for review to both the Survey's central office in Urbana and its field laboratory at Sullivan. This review will serve as a response for both relative to the natural history aspects of the Statement.

In general, the Statement seems to be quite complete, very comprehensive and basically sound. However, members of the Survey staff have brought a number of omissions and inaccuracies to my attention. While a number are quite minor, several are rather significant:

Volume I

Page I-27, par. 2. The Survey and the Department of Conservation cooperate in managing the fish nursery pond which the Survey constructed and operated for several years. However, the Survey monitors stream and lake water quality.

Par. 5. The 200 acre marsh area is operated jointly by the Survey and the Department.

Page I-28, par. 3. There are actually 10 test sites at normal pool stage for monitoring parameters of water quality: 4 in the lake, 5 in tributaries, and one below the dam. The results of these investigations are not necessarily coordinated with the State's Reservoir Fisheries Biologist.

Plate II-12. The Survey's monitoring station no. 10, located at the Illinois route 121 bridge over the Kaskaskia about a mile north of Allenville, is not shown on the plate.

Page II-32, par. 4. One could infer from this paragraph that the Kaiser Chemical Company is a constant source of spilled phosphates. This may not be a fair conclusion because Station 5 is also behind Sullivan's sewage treatment plant, an equally possible source of continued high phosphorus levels.

Page II-37. Should not Illinois State Water Supply be Illinois State Water Survey?

Page II-38, par. 4. It is not clear which "other migrant birds" are meant by the statement. For many species of birds and for bats, the reservoir may have effectively eliminated their "appropriate habitat" in the lands now flooded.

Page II-45, par. 1. The osprey is probably not as abundant as is implied here. The shrews are ignored in this list of common forest mammals and are also omitted from the list of mammals in other habitats (II-46) although they are identified in vol. II, Table F-5.

Page II-47, par. 2. Skunks and raccoons, among others, should be added to the list of mammals found in cultivated fields.

Although white-tailed deer are mentioned in one or more habitats, we find little or no discussion of them in the wildlife resources section.

Page II-49, par. 1. Perhaps conditions other than a requirement for cold water are more responsible for the failure of northern pike to "do very well". Indeed, the growth of fish planted in Lake Shelbyville has been exceedingly good.

Page II-53, par. 2. Crappies have become established and have been providing a fishery since impoundment.

Page V-15 Alternative 1. We recommend the utilization of the unharvested commercial fish population as needed to control their numbers. We do not recommend managing the reservoir to enhance this population nor do we believe a local processing plant would be economically profitable because of the relatively low volume and short season.

Page V-18. Alternative 2. We suggest the development of several additional subimpoundment marshes for rearing of fish. These valuable tools may aid in the maintenance of adequate population of largemouth bass, walleye, and channel catfish and can be used as well for waterfowl marshes. Fluctuations in lake level would have to be reduced in order for them to be effective on a yearly basis. Additional funds should be allocated for fish population studies. The Survey's long term studies of impoundments indicate rapid and extensive drawdowns implemented on a regular schedule constitute a useful means for maintaining an adequate predator-prey ratio in the lake. To be effective, the drawdown should be adequate to reduce the surface area to about one-half of the normal pool or to an elevation of about 583' at 5 year intervals.

Page VIII-1. "Illinois Department of Natural History" should be "Illinois Natural History Survey Laboratory".

Pages IX-1 to IX-14 inclusive. The bibliography needs a thorough re-examination and a consistent style be adopted for citing literature. There are errors in authors names and initials, and the identifications of the sources of articles are incomplete. For example - citation no. 11, page IX-1. "Brigham A.R., W.U. Brigham and D.W. Dufford March, 1972. Water Quality Investigations in the Lake Shelbyville, Illinois Basin. Illinois Natural History Survey Laboratory, Sullivan. 32 pages." might better read "Brigham A.R., W.U. Brigham and D.W. Dufford. March, 1972. Water Quality Investigations in the Lake Shelbyville, Illinois Basin. Illinois Natural History Survey unpublished report to U.S. Army Engineer District, St. Louis, 32 pages."

Volume II

Table F-1. Such species as elder, grape, greenbrier, osage-orange, poison ivy, dewberry, and sumac should also be identified as being species important to wildlife for food or cover. Cinquefoil is listed here as a woody plant. Gleason, Fernald, etc., consider it to be an herb.

Table F-5, page F-17. Scientific name of striped skunk is misspelled. Should be Mephitis mephitis.

Table F-6, page F-19. The order of listing seems to be random. It would be more useable if the listing is a natural sequence of families with the species of each family alphabetized to generic and specific names.

The common name for Lepomis microlophus, Redear Sunfish, is not hyphenated.

The common name for Moxostoma macrolepidotum is Shorthead Redhorse, not Northern Redhorse.

The common Shiner Notropis cornutus probably refers to the Striped Shiner. Notropis chrysocephalus which was elevated from a subspecies of N. cornutus to specific rank by C.R. Gilbert, 1964, Bull. Fla. St. Mus., Biol. Sci., 8 (2):157.

The scientific name for the Warmouth is Lepomis gulosus, not Chaenobryttus aulosus.

The spelling of the scientific name for Walleye should be Stizostedion vitreum vitreum.

Additional species collected from Lake Shelbyville by Survey personnel which should be added to the list include:

Striped shiner	Notropis chrysocephalus
Suckermouth minnow	Phenacobius mirabilis
Highfin carpsucker	Carpiodes velifer
Lake chubsucker	Erimyzon sucetta
Spotted sucker	Minytrema melanops
Tadpole madtom	Noturus gyrinus
Pirate perch	Aphredoderus sayanus
Mud darter	Etheostoma asprigene

Page F-22, par. 2. Stinauer (1964) is understood to have collected by the rotenone, potassium permanganate method in addition to seine hauls.

Page F-23, par. 4. The statement, "Tributary streams...probably will experience little change in their fish fauna" is untrue and ignores the many species of small fishes whose habitats have been eliminated.

Table F-10, page F-27. This list is incomplete and the Survey does not agree with the projections given relative to which will disappear and which will survive in a lake habitat.

Page F-30. The walleye stocking number on May 6, 1971, should read 1,020,000.

Table F-11, page F-36.

Noeomis biguttatus should be Nocomis biguttatus.

Notropis bopps should be Notropis boops.

Notropis c. chrysocephalus is now changed to Notropis chrysocephalus.

We trust these comments will be helpful.

Sincerely yours,

George Sprugel, Jr.
Chief

GS:pd

STATE OF ILLINOIS

DEPARTMENT OF CONSERVATION

605 STATE OFFICE BUILDING
400 SOUTH SPRING ST.
SPRINGFIELD 62706

CHICAGO OFFICE—1227 S. MICHIGAN AVE. 60605

November 25, 1974

Mr. John F. Marzec
Outdoor Recreation Planner
Department of the Army
St. Louis District, Corps of Engineers
201 North 12th Street
St. Louis, Missouri 63101

Dear Mr. Marzec:

Receipt is acknowledged of volumes 1 and 2 of Environmental Impact Statement of Operation and Maintainance, Lake Shelbyville, Illinois.

On page II-61, the Statement correctly observes that there are no National Register sites in the lake area. A Review of Inventory of Architecture in Shelby County shows that numerous structures in Shelbyville have been identified by the Illinois Historic Structures Survey as of historic importance. Any of these structures could at some future date be nominated to the National Register.

The Inventory of Historic Landmarks for Moultrie County has been completed and no historic landmarks are recorded in the project area. The Inventory of Historic Landmarks for Shelby County has not been completed as of this date. The Director of the Illinois Historic Landmarks Survey should be contacted for his inputs on this matter.

The letter from Dr. Charles Bareis, dated July 29, 1974, emphasizes the need for an archaeological reconnaissance party to survey the area. I have to date received no report of this survey.

Before the Department of Conservation can sign off on the project, three requirements remain to be fulfilled:

1. Clearance from the Director of the Illinois Historic Structures Survey that the project will not affect historic structures in Shelbyville, a listing of these structures is supplied herewith.

2. Clearance from the Director of the Illinois Historic Landmarks Survey to the effect that no historic landmarks in Shelby County will be affected by the project.

3. Clearance from the Director of the Illinois Archaeological Survey to the effect that no archaeological sites will be affected by the project.

Thank you for this opportunity to review and comment.

Sincerely yours,

Anthony T. Dean
State Historic Preservation Officer

ATD/psb

cc: Dr. Charles Bareis, Director, Illinois Archaeological Survey
Mr. William G. Farrar, Director, Illinois Historic Landmarks Survey
Mr. Paul E. Sprague, Director, Illinois Historic Structures Survey

To: Colonel Thorwald R. Peterson
Colonel, CE
District Engineer
Dept. of the Army
St. Louis District, Corps of Engineers
210 N. 12th St.
St. Louis, Missouri 63101

Re: ENVIORNMENTAL IMPACT STATEMENT OF OPERATION AND MAINTENANCE LAKE SHELBYVILLE, ILLINOIS "HARLAN BARTHOLOMEW AND ASSOCIATES"

Dear Colonel Peterson:

This tome is a monumental compilation of facts worthy of any interested individuals attention - magnificently done, thoughtfully prepared, efficiently organized, and fairly presented. I am most grateful for the opportunity to give it attention and find it most thoughtful and considerate of the district engineer and the Corps to include the involved counties and their officers in their deliberations.

In order to place any comment to follow in the proper perspective, let it be understood that these observations are not as the result of the deliberations of the Moultrie County Board nor have I been specifically authorized to make any summations representing the Moultrie County Board's position. The following remarks are mine alone and I can but hope that the members of the Moultrie County Board concur.

Regarding planned construction (I-13) the Corps is certainly to be applauded in it's efforts to expand camping and picnic facilities and we most definitely hope that the Corps will be able to facilitate and

expedite tent camping and boat camping areas as well as the Ecological study areas and cabin facilities. We want to encourage this type of expansion and feel it is incumbent upon us to discharge our responsibilities expeditiously so that Moultrie County will be looked upon favorably for new construction and expansion in the above listed facilities as well as the resort type development.

(I-27) We salute your efforts to establish a no wake zone of 300 feet from the shore line and without any doubt this is a fundamentally sound policy but in our opinion, regretfully, few people are aware or observe this regulation. May we suggest that the regulation be more widely circularized as it is quite apparent that many well mannered and observant boatmen reduce their speed in the marked areas but in the absence of indicators run at high rates of speed close to shore. Perhaps more publicity of this laudable policy associated with some judicious punitive efforts would create a healthy observance of this ordinance.

(III-2 Paragraph II) We certainly subscribe to the sentiments expressed by this paragraph and recognize our increased responsibilities on a county level as particularly to be noted by the increased road usage and the increased need for policing activities by the Sheriff and his staff. We do indeed take cognizance of our responsibilities and hope that our attempts to upgrade the Sheriff's office with increased personnel, increased salaries, increased equipment and last, but not least, by the establishment of the merit system in accord with the

recommendations of the Illinois Law Enforcement Commission will be productive of material improvement in law enforcement, crime deterence and promotion of safety.

With regards increased road usage we are please to advise you that Moultrie County is going forward with plans to pave 3.7 miles of the Bruce-Findlay road from Rt. 32 west and thus we feel we are honoring our commitment to responsible local governmental involvement in establishing the excellence of Lake Shelbyville. Moreover, we are mindful and deeply grateful for the attention and cooperation the Corps has extended Moultrie County in the form of the joint effort to improve the approach roads to Whitley Creek and Wilborn Creek Areas. We feel this is a manifestation of your continuing desire to cooperate with local government to solve local problems in which you may be tangentially involved and feel that we have accepted the challenge by proceeding with the planning and construction of these roads with the full knowledge that we are mutually interdependent in this as well as many other concurrent problems. For what we feel is an outstanding job in highway planning, design and liaison with the Corps a great deal of credit must be given our Moultrie County Highway engineer, Ben McRill P.E.

(III-3 III-8) Pursuant to the above comments we feel that even though direct benefits to the County may not be entirely obvious and apparent, as indicated by this study, nevertheless the intangible benefits of community health, progress, modernization, and many other

factors of remarkable import will make Lake Shelbyville a tremendous asset over many years particularly if we manage our affairs responsibly.

Finally we would not have the temerity to suggest to the Corps methodology of management of the reservoir for we have neither the over riding problems, nor the consumant, ultimate and protean responsibility in the operation of this difficult project but for the very reason that our view is narrower, and our interests primarily local, we would like to encourage one of the management alternatives most beneficial to recreation in Which the level of the pool is held more or less constant at a level approximating 600 feet MSL recognizing that, even so, there will be variations in extremes of meterological conditions. Such alternate methods of operation have been succinctly set out in the scholarly discussion of alternatives to which we would like to call attention. The severe variation of levels this year emphasize the problems of marina operators, erosion control, park and ramp maintenance, downstream flooding and clearance of bank debris. The last will be a monstrous obstacle to seemly bank management. (Could we develop a concomitant local project to assist in driftwood cleanup and bank beautification)?

Colonel Peterson, We want to be neither presumptuous nor pretentious in commending you and the St. Louis Corps of Engineers for commissioning this study and to congratulate Harland Bartholomew and Associates for a difficult job remarkably well done.

Respectfully submitted,

Phillip H. Best, M.D.

Phillip H. Best, M.D.

Shelbyville
Chamber of Commerce
246 East Main Street Shelbyville, Illinois 62565
Phone 217/774-2221

July 30, 1974

Colonel Thorwald R. Peterson, District Engineer
Department of the Army
St. Louis District, Corps of Engineers,
210 North 12th Street
St. Louis, Missouri 63101

Dear Colonel:

The two Volumes sent to me in June 1974 on the Draft of the Environmental Operation and Maintenance of Lake Shelbyville I found very interesting and well put together.

I feel the research on this has been very good, and any comments which I could make would be nothing more than Congratulations.

Thank you so much for these two Volumes. I feel that they will be very helpful to all of us now and in the future.

Sincerely,

SHELBYVILLE CHAMBER OF COMMERCE
Ferrell G. Barricklow
Ferrell G. Barricklow,
Executive Secretary.

FGB:dh

Migratory Waterfowl Hunters, Inc.
P.O. Box C
GODFREY, ILLINOIS 62035

July 26, 1974

Department of the Army
St. Louis District, Corps of Engineers
210 North 12 Street
St. Louis, Missouri, 63101

ATTN: Thorwald R. Peterson, Colonel, CE
District Engineer

Dear Sir:

In reference to your letter of 12 June 1974 regarding Draft Environmental Impact Statements on the operation and maintenance of Lake Shelbyville, Illinois, we submit the enclosed comments.

Thank you for the opportunity to review this draft.

Yours for better hunting,

Miles R. Brueckner

Miles R. Brueckner
President

Enclosure

DRAFT ENVIRONMENTAL IMPACT STATEMENT

ON THE OPERATION AND MAINTENANCE

OF LAKE SHELBYVILLE, ILLINOIS

Migratory Waterfowl Hunters Incorporated have noted that no specific waterfowl management plans are contained in this Draft Environmental Impact Statement. We have noted, however, that a meeting to devise such a plan will be held with the Illinois History Natural Survey and the Division of Wildlife and Fisheries personnel in December 1974. We fear that the same waterfowl management techniques used at Carlyle and Rend Lakes may be implemented at Lake Shelbyville, and this type of management has proven to be disastrous.

At Carlyle Lake vast numbers of food-producing oak and hickory trees have been destroyed because of poor management and this definitely is not conducive to good waterfowl habitat. We believe that the walk-in hunting areas are discriminatory to our senior citizens and young people. Our senior citizens and young people cannot withstand the physical requirements necessary to hunt the walk-in areas. These areas are in such a location that the Illinois Department of Conservation says "you must have a good set of legs to hunt".

In the few short years of waterfowl hunting at Carlyle and Rend Lakes, four and possibly more hunters have lost their lives. This is a tragic testimony to poor and improper management. Hunter safety should be of paramount importance in establishing a waterfowl hunting program. Walk-in hunting where the water is more than ten feet deep in some areas certainly cannot be considered safe.

We have submitted the following recommendations which we feel is the proper format for establishing good quality hunting, hunter safety, and a system that is exceptionally equitable and utilitarian and similar to the system now utilized in most of the other public hunting areas in the state.

1) That Migratory Waterfowl hunting be done only from those sites located and staked by the Illinois Department of Conservation.

2) That these sites be no less than 150 yards apart.

3) That permanent waterfowl hunting facilities be built on these sites.

4) That the Illinois Department of Conservation hold a first-year draw for interested hunters to draw for these blind sites.

5) That the Illinois Department of Conservation have an annual draw for all unclaimed blind sites.

6) That during waterfowl season, those blinds not claimed by the blind builder one hour prior to shooting time be allocated on a lottery basis.

7) That all blind sites be reallocated no less than every two years.

8) That these blind sites be built, brushed, and maintained by the person whose name is drawn at the annual draw.

9) That the Illinois Department of Conservation set a standard for the construction of these blind sites and perform an inspection of these sites no less than three weeks prior to the opening of waterfowl season.

10) That the Illinois Department of Conservation construct a truly adequate levy system capable of rendering the entire waterfowl areas completely dry during the planting season.

PART X

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AD-A116 129 ARMY ENGINEER DISTRICT, ST LOUIS MO F/G 15/7
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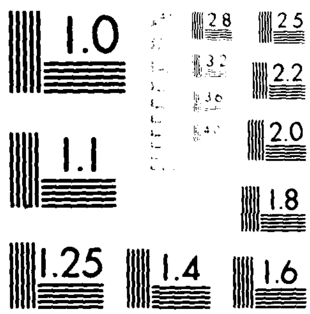

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

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